DOCUMENT RESUME

ED 458 972 PS 029 933

| | |
|---|---|
| AUTHOR | Costello, Anthony; Francis, Victoria; Byrne, Ali; Puddephatt, Claire |
| TITLE | State of the World's Newborns: A Report from Saving Newborn Lives. |
| INSTITUTION | Save the Children, Westport, CT. |
| ISBN | ISBN-1-888393-05-X |
| PUB DATE | 2001-00-00 |
| NOTE | 59p. |
| AVAILABLE FROM | Save the Children, Department of Public Affairs and Communications, 54 Wilton Road, Westport, CT 06880. Tel: 203-221-4000; Fax: 203-226-6709; Web site: http://www.savethechildren.org. |
| PUB TYPE | Numerical/Quantitative Data (110) -- Reports - Descriptive (141) |
| EDRS PRICE | MF01/PC03 Plus Postage. |
| DESCRIPTORS | Breastfeeding; *Child Health; Developed Nations; Developing Nations; *Health Services; Immunization Programs; *Infant Mortality; *Infants; Mortality Rate; *Neonates |

ABSTRACT

There has been little change in newborn mortality in the past 20 years, even through proven, cost-effective solutions exist to save many of these young lives. This report reviews the most recent data on the newborn, revealing the alarming poor health and quality of health care for mothers and newborns in virtually all impoverished countries. The report identifies infections, complications of prematurity, and birth asphyxia and injuries as the primary causes of newborn mortality, with low birth weight an important secondary factor. Another major cause of neonatal deaths in developing countries is identified as poor maternal health, especially during pregnancy. The report argues that many of these neonatal deaths can be prevented with three cost-effective solutions that do not depend on highly technical training or sophisticated equipment: (1) tetanus toxoid immunization; (2) skilled health care at delivery; and (3) immediate and exclusive breastfeeding. Further, the report maintains that policymakers, nongovernmental organizations, health care professionals, and community leaders need to collaborate in strengthening existing health care delivery systems to provide expectant mothers and their babies the care they need. A key part to this effort is advocating for and creating policies that address newborns' special needs. The report's appendices include tables providing information on newborn health status and on newborn health services and practices, by country, and as well as each country's rank on the Human Development Index, a composite indicator of development status that includes life expectancy at birth, educational achievement, and real gross domestic product per capita. (Contains 84 endnotes.) (KB)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 458 972

# STATE OF THE WORLD'S NEWBORNS

A Report from Saving Newborns Lives

Save the Children.

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

Amy Jo Dowd

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

PS 029933

BEST COPY AVAILABLE

Save the Children.

WOMEN & CHILDREN FIRST
WCF

## TABLE OF CONTENTS


2 Foreword by Melinda French Gates

3 Introduction by Charles MacCormack and Thomas S. Murphy

4 Executive Summary

10 Making the Case

18 A Slender Thread: The Vulnerable Newborn

24 Improving Newborn Health

36 The Way Forward: Saving Newborn Lives

42 Endnotes

43 Abbreviations

44 Appendices
- Statistical Overview of Newborn Health
- Table I Newborn Health Status
- Table II Newborn Health Services
- Explanatory Notes on Tables

48 Call to Action
Acknowledgments

"We know what needs to be done.
We have the tools. It is time to
marshal global political will and
to commit unprecedented
resources to saving newborn
lives. We call on the world to give
children a healthy start now."

**Melinda French Gates**
Co-founder, Bill &
Melinda Gates Foundation

## FOREWORD

I believe every child should have the chance for a healthy start in life. Yet in many parts of the world, life-saving interventions are often not available.

Newborn mortality is one of the world's most neglected health problems. Worldwide, more than eight million babies each year are stillborn or die before they reach the age of one month.

Though these numbers are tragic, what's more devastating is the fact that we have the tools to address this situation yet fail to apply them. We can save many newborn lives through existing health care interventions that are both practical and affordable, even in communities that lack modern health care facilities.

At the heart of the problem is a stubborn and widening gap between the health of the world's rich and poor. Ninety-eight percent of these early deaths occur in developing countries. Simply put, most pregnant women and newborns living in impoverished circumstances do not, or cannot, get access to basic health care services—either before, during, or after delivery.

The Bill & Melinda Gates Foundation is supporting Save the Children's Saving Newborn Lives initiative as part of a global initiative to improve the health and survival of newborns in the developing world.

To set the stage for this global effort, the Saving Newborn Lives initiative is issuing this first-ever report, *State of the World's Newborns*, to draw attention and pose solutions that will help save lives.

Drawing on the most recent data available from the World Health Organization, UNICEF, and other organizations, this report provides data on the situation of mothers and their newborns in 163 countries. It also outlines what can be done to address this critical, and largely neglected, health crisis.

Because the health of women and children go hand in hand, the report also shares personal stories of women from around the world about their experiences with childbirth and care of their newborns.

Over the next five years, Save the Children will work with partners at the global and national level to improve health care policies and programs for mothers and newborns, with a special emphasis on those countries in greatest need. The Saving Newborn Lives initiative is designed to integrate essential newborn health care into existing maternal and infant care programs. Coupled with efforts to improve household and community practices, this strategy can make a lasting difference in the health of mothers and their newborns.

We know what needs to be done. We have the tools. It is time to marshal global political will and to commit unprecedented resources to saving newborn lives. We call on the world to give all children a healthy start now.

Melinda French Gates
Co-founder, Bill &
Melinda Gates Foundation



BEST COPY AVAILABLE

## INTRODUCTION

On the eve of the United Nations Special Summit on Children, Save the Children is issuing the first-ever global report on the very youngest members of the global community: *State of the World's Newborns*. As international leaders sit down together to discuss the status of children, we at Save the Children believe that support must start at the very beginning. At birth, the odds for a healthy life are first set. What is the fate of the 350,000 babies born each day?

It is a tragic irony that in many countries, the odds are stacked against mothers and their babies just when both are at their most vulnerable and at greatest risk. Throughout the developing world, expectant mothers and their newborns run a gauntlet of health risks with little or no support or health care. Many of them do not survive the ordeal.

Save the Children initiated the Every Mother/Every Child campaign in 2001 to cast light on the lives of the millions of mothers and newborns worldwide who balance precariously on the brink between life and death. These are the 53 million women who give birth at home, without the help of professional birth attendants with delivery skills. Over four million newborns succumb to disease or complications of childbirth before they have seen a month of life and a similar number are stillborn. This situation reflects an unacceptable state of neglect in contemporary health care.

On Mothers' Day 2001, Save the Children released *State of the World's Mothers*, a country-by-country rating of the status of women and young girls according to health, education, and socio-economic indicators. All the data point to the following conclusion: *When mothers survive and thrive, children survive and thrive*. And for mothers to thrive, they must have access to education; maternal and child health care, including family planning; and economic opportunities. Save the Children is committed to making this happen.

In the present report, *State of the World's Newborns*, we turn to the needs of newborns and the essential health care required for their future survival and well-being. Despite the daunting magnitude of newborn mortality each year, we *can* reverse this trend by initiating key health solutions that are proven, affordable, and doable. These include clean delivery practices, skilled care at birth, tetanus toxoid immunization, warmth and drying, and immediate and exclusive breastfeeding. Save the Children has developed a strategic program—Saving Newborn Lives—to help make that happen.

Thanks to the support of the Bill & Melinda Gates Foundation, the Saving Newborn Lives initiative is undertaking on-the-ground programs in Asia, Africa, and Latin America that will demonstrate how positive change is possible through judiciously supplied health measures. We count on the world's leaders to take stock of how mothers and newborns fare in every country. Investing in this most basic partnership of all—between mother and newborn—is the first and best step in ensuring healthy children, prosperous families, and strong communities.

Thomas S. Murphy

**Thomas S. Murphy**
Chairman, Board of Trustees
Save the Children

Charles MacCormack

**Charles MacCormack**
President, Save the Children

**EVERY MOTHER/EVERY CHILD CAMPAIGN MAKES NEWBORN AND MATERNAL HEALTH A PRIORITY**

**Nearly 70 years of field experience have taught Save the Children that to create real and lasting change in the quality of children's lives, we need to invest in their mothers. On Mothers' Day 2001, Save the Children launched a global public awareness and advocacy campaign—Every Mother/Every Child. Its goal is to ensure that mothers in developing countries have the tools they need to raise children who not only survive but thrive. These tools include maternal and child health care, family planning, education, and economic opportunities. Reducing newborn and maternal deaths are among the top priorities of the campaign. When communities take measures to ensure that mothers are healthy, well nourished, and well educated, their children are more likely to do well and to grow into strong, productive members of society.**

BEST COPY AVAILABLE

# EXECUTIVE SUMMARY

People in industrialized nations accustomed to specialized medical attention and hospital-based care find it hard to imagine that millions of babies die every year for the want of such simple, low-cost expedients as regularly giving two doses of tetanus toxoid vaccine to a mother during pregnancy, arming a skilled birth attendant with a simple delivery kit (a plastic sheet, a bar of soap, string to tie the umbilical cord, and a razor to cut it), or encouraging a mother to exclusively breastfeed and keep her baby warm. Yet these are examples of measures we know can help save countless newborn lives in developing countries. The challenge now is to make these and other simple, affordable measures more widely available and used, while working to develop new and better community-based measures to treat certain newborn complications, such as infections and birth asphyxia.



BEST COPY AVAILABLE

## MAKING THE CASE

Each year, an estimated four million babies die before they reach the age of one month, and four million more are stillborn (dying between 22 weeks of pregnancy and birth).[1] Ninety-eight percent of these newborn deaths take place in developing countries, and, for the most part, these newborns die at home, in the absence of any skilled health care.[2] Enormous disparities exist between rich and poor countries. A mother in western Africa, for example, is 30 times as likely as a mother in Western Europe or North America to lose her newborn in the first month of life.

In the *State of the World's Newborns*, we review the most recent data on the newborn, revealing the alarmingly poor health and quality of health care for mothers and newborns in virtually all impoverished countries. While there has been a dramatic reduction in under-five mortality in the past two decades, there has been relatively little change in newborn mortality, even though proven, cost-effective solutions exist to save many of these young lives. Indeed, newborn deaths now constitute over 40 percent of all deaths to children under age five. Until recently, policymakers and program planners focused relatively little attention on this age group, concentrating instead on interventions that primarily benefit infants over one month of age. We now recognize, however, that additional gains in child survival will depend in large measure on saving newborn lives.

## A SLENDER THREAD: THE VULNERABLE NEWBORN

According to the World Health Organization's estimates for 2001, infections account for 32 percent of newborn deaths (tetanus, sepsis, pneumonia, and diarrhea), complications of prematurity explain a further 24 percent, and birth asphyxia and injuries cause 29 percent.[3] An important secondary factor in 40 to 80 percent of neonatal deaths is low birth weight (a weight of less than 2,500 grams at birth).[4]

In addition to inadequate care of newborns, another major cause of neonatal deaths in developing countries is the poor health of mothers, especially during pregnancy, delivery, and the early postpartum period. Many pregnant women are inadequately nourished, overworked, and may still be recovering from a previous pregnancy. For many mothers, health care during this critical period is virtually nonexistent. It is estimated that last year 53 million women in developing countries gave birth with no professional health care whatsoever.[5]

## IMPROVING NEWBORN HEALTH

Most of these neonatal deaths can be prevented with cost-effective solutions that do not depend on highly technical training or sophisticated equipment. Proper nutrition and hygiene, for example, are the answer in many cases, while other deaths can be prevented by using widely available vaccines and medications to prevent and treat infections, by having skilled health care on hand during and after delivery, by recognizing and promptly treating obstetric complications, by keeping the baby warm and the umbilical cord clean, and by improving breastfeeding and family planning practices. By looking after the health of expectant mothers—before, during, and after delivery—many of the causes of newborn death can be prevented before they occur.

As noted above, there are several approaches to reducing newborn deaths that have been proven to be both feasible and cost-effective, including:

- **Tetanus toxoid immunization:** Over 300,000 newborns die each year of neonatal tetanus—a highly preventable illness virtually unknown in the developed world. Two doses of tetanus toxoid, delivered as part of routine prenatal care for a little over

US$1.00, can provide protection for both the mother and newborn.

- **Skilled health care at delivery:** In many developing countries, most deliveries occur at home—and typically in the absence of an attendant trained in midwifery skills. The lack of knowledge and skills needed to help ensure a clean and safe delivery often results in otherwise avoidable illness, complications, or even death. Yet community-based health workers and other community members could be trained to better manage normal deliveries, to recognize danger signs, and to refer mothers in cases of obstetric complication. But training in and of itself is not enough; transport and emergency obstetric care must be available for back-up support.
- **Immediate and exclusive breastfeeding:** Despite the proven benefits of immediate and exclusive breastfeeding, these practices are still the exception rather than the rule in many countries. Over 80 percent of all newborns in Asia, for example, are not put to the breast at all within the first 24 hours.[6] While some cultures discourage early breastfeeding because colostrum (or first milk) is thought to be unclean, nursing the newborn immediately after birth provides much-needed immune defense, nutrients, warmth, and bonding with the mother—things every newborn needs to survive and thrive. Education on breastfeeding should be regularly included as part of prenatal, delivery, and postnatal care, emphasized in community-based behavioral change strategies, and supported by advocacy at national and regional levels.

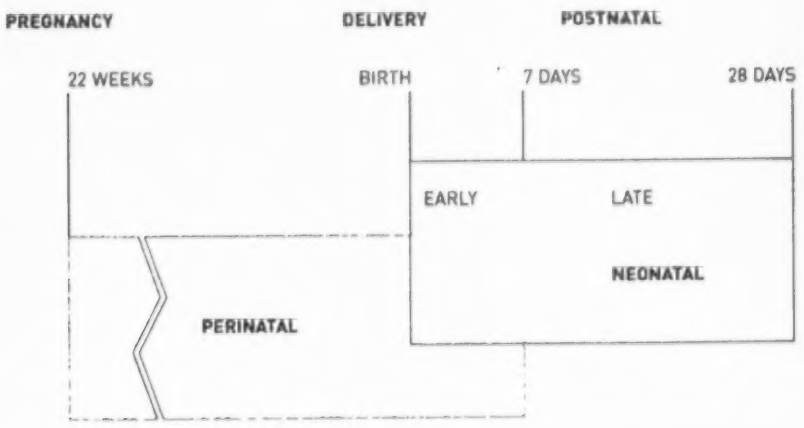
## THE WAY FORWARD: SAVING NEWBORN LIVES

Policymakers, nongovernmental organizations (NGOs), health care professionals, and community leaders need to collaborate in strengthening

**TETANUS TOXOID IMMUNIZATION**

**One success story comes from Bangladesh where death rates from neonatal tetanus have been reduced by 90 percent in just over a decade. With government commitment and support from a range of partnerships, a massive immunization campaign was launched in the mid-1980s, increasing coverage with tetanus toxoid vaccine from 5 percent in 1986 to 86 percent in 1998. Thanks to this increase, Bangladesh reduced neonatal tetanus death rates from 41 for every 1000 live births in 1986 to only 4 per 1000 by 1998.[7]**
**BANGLADESH**

FIGURE 1 **PERINATAL AND NEONATAL MILESTONES**




**STILLBIRTH** The death of a fetus weighing at least 500 grams (or when birth weight is unavailable, after 22 completed weeks of gestation or with a crown-heel length of 25 centimeters or more), before the complete expulsion or extraction from its mother.

**PERINATAL DEATH** The death of a fetus weighing at least 500 grams (or when birth weight is unavailable, after 22 completed weeks of gestation or with a crown-heel length of 25 centimeters or more) or the death of an infant during the first week of life.

**NEONATAL DEATH** The death of a live-born infant during the period that commences at birth and ends 28 completed days after birth.

**TRAINING IN ESSENTIAL CARE FOR NEWBORN HEALTH**

**Another success story comes from the Gadchiroli district in India where the nonprofit organization SEARCH has trained village health workers and traditional birth attendants to provide appropriate health care for women during pregnancy, assistance in clean deliveries, proper response to complications for both mother and baby, as well as support for breastfeeding, care for low birth weight babies, and family planning. As a result, neonatal mortality has been reduced by approximately 60 percent through home-based care among isolated, rural villagers.'** INDIA

**POLITICAL COMMITMENT**

**"Africa needs intensive mobilization of people who have the power and means to reduce maternal and neonatal mortality on the continent." This observation by Madame Adame Ba Konare, First Lady of Mali, represents the kind and level of advocacy needed to advance the newborn agenda. At a meeting in May 2001, the first ladies of West and Central Africa argued eloquently for "leadership and commitment from within Africa itself." Conferences such as these are important for creating a policy environment favorable to health reform and for helping key agencies and individuals to move from rhetoric to action."** MALI

existing health care delivery systems to provide expectant mothers and their newborns healthy alternatives to the chronic pattern of disease and death at the beginning of life.

A key part of this effort will be advocating for and creating policies at all levels that address the special needs of newborns. If newborn care programs are to receive the support they need—the kind of support currently available for reproductive health, child health programs, and communicable disease prevention, for example—they will need to become a national priority and figure prominently in national health plans and health reform programs. When policies are in place, then other needed changes are more likely to follow; for example, funding commitments, professional and technical changes such as revised national curricula and recruitment and deployment of staff, and the mobilization of nongovernmental organizations.

Another front in this effort will be to strengthen and expand proven cost-effective services. We can begin, in short, by doing more of what we know works and, wherever possible, doing it better, such as promoting tetanus immunization and breastfeeding, as noted above. We can also make a concerted effort to identify other feasible, cost-effective approaches to newborn care that can be easily replicated at the household and community level. Meanwhile, we can work on incorporating a newborn care component into existing safe motherhood and child survival programs, ensuring that postnatal care for mother and baby becomes as routine as prenatal care. Finally, we can add a newborn component to other ongoing health initiatives that also target mothers, such as family planning and prevention programs for sexually transmitted infections.

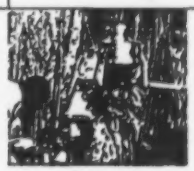
Another piece of this effort must be to mobilize the resources—financial, human, and material—that are available to improve newborn health. While this can mean supplementing existing resources, in many cases this is not realistic or even necessary. A first effort should be to ensure that the resources presently available are used as efficiently as possible. For example, there may be scope to reallocate resources within government health budgets to add those newborn health components that have been found to be cost-effective. Also, in countries where several NGOs and assistance agencies are working in health, better efforts to coordinate their activities will help to integrate these newborn health components. Nevertheless, to go to scale with the essential interventions for newborn health, most countries will require incremental resources that need to be provided on a long-term, sustainable basis.

We also need to collaborate with local organizations and research institutions to advance the state of the art of newborn care, identifying and testing promising new, low-cost approaches and technologies, and improving our understanding of cultural factors that affect community and household practices.

Collaboration must be a common thread in all of these efforts, working together in strategic partnerships with a wide range of institutions in developed and developing countries, including universities and other NGOs, government ministries, and international agencies. The potential for impact expands greatly whenever resources and experiences are shared.

All of these investments will pay off—and not just in reduced mortality rates. Evidence is growing that healthy newborns are more likely to be healthy adults, greatly reducing the social and economic costs of illness and disability. And when newborns survive, mothers are more

BEST COPY AVAILABLE



### CARE OF FUTURE MOTHERS

- Improve the health and status of women
- Improve the nutrition of girls
- Discourage early marriages and early childbearing
- Promote safer sexual practices
- Provide opportunities for female education

### CARE DURING PREGNANCY

- Improve the nutrition of pregnant women
- Immunize against tetanus
- Screen and treat infections, especially syphilis and malaria
- Improve communication and counseling: birth preparedness, awareness of danger signs, and immediate and exclusive breastfeeding

SPECIAL ATTENTION

- Monitor and treat pregnancy complications, such as anemia, preeclampsia, and bleeding
- Promote voluntary counseling and testing for HIV
- Reduce the risk of mother-to-child transmission (MTCT) of HIV

### CARE AT TIME OF BIRTH

- Ensure skilled care at delivery
- Provide for clean delivery: clean hands, clean delivery surface, clean cord cutting, tying and stump care, and clean clothes
- Keep the newborn warm: dry and wrap baby immediately, including head cover, or put skin-to-skin with mother and cover
- Initiate immediate, exclusive breastfeeding, at least within one hour
- Give prophylactic eye care, as appropriate

SPECIAL ATTENTION

- Recognize danger signs in both mother and baby and avoid delay in seeking care and referral
- Recognize and resuscitate asphyxiated babies immediately
- Pay special attention to warmth, feeding, and hygiene practices for preterm and LBW babies

### CARE AFTER BIRTH

- Ensure early postnatal contact
- Promote continued exclusive breastfeeding
- Maintain hygiene to prevent infection: ensure clean cord care and counsel mother on general hygiene practices, such as hand-washing
- Provide immunizations such as BCG, OPV, and hepatitis B vaccines, as appropriate

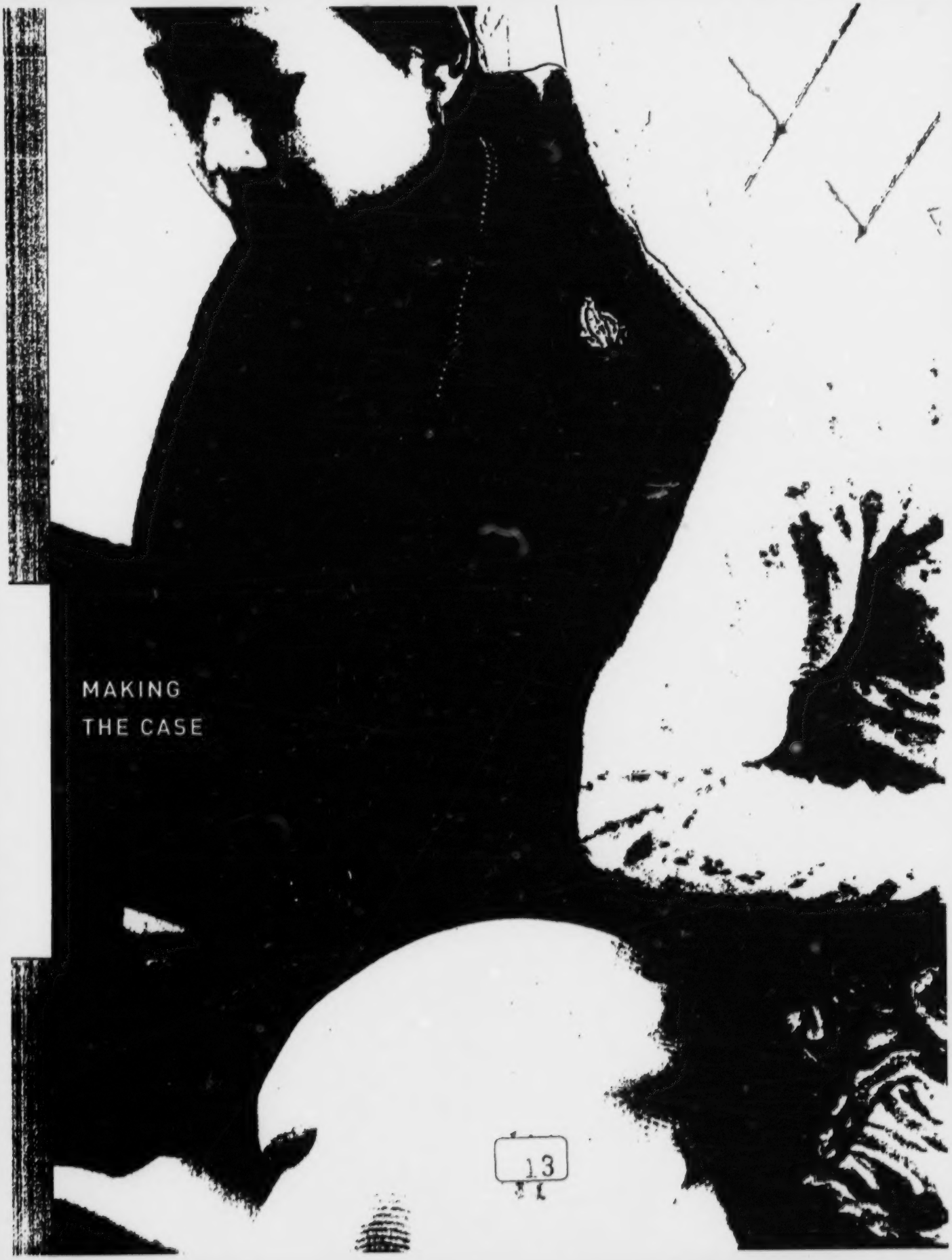
SPECIAL ATTENTION

- Recognize danger signs in both mother and newborn, particularly of infections, and avoid delay in seeking care and referral
- Support HIV positive mothers to make appropriate, sustainable choices about feeding
- Continue to pay special attention to warmth, feeding, and hygienic practices for LBW babies

likely to space their pregnancies, thereby improving their own health as well as that of their children. This in turn leads to reduced fertility rates and contributes to the demographic transition from high to low fertility and mortality.

Reducing newborn and maternal mortality does not require medical breakthroughs, expensive technology, or the makeover of national health care systems. Major strides can be made by putting existing solutions into general practice, while the search continues for the most effective way to bring about behavioral change and to treat certain complications, such as asphyxia, in the newborn. With the support and collaboration of national decision-makers, community leaders, health care professionals, and assistance agencies, the world's newborns can receive the care and resources they need to survive and prosper.

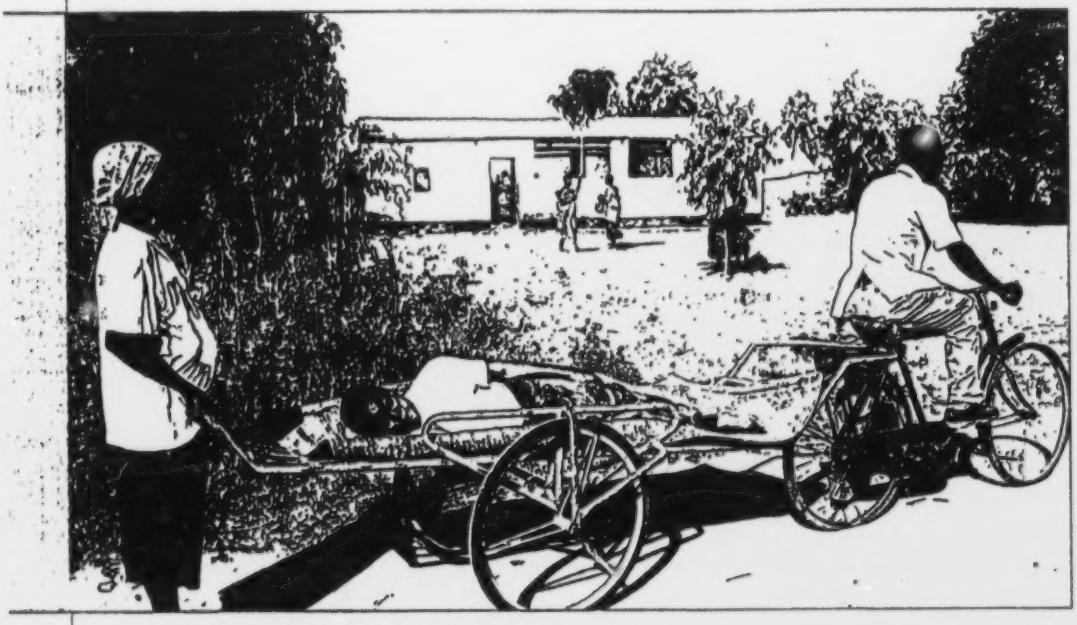
BEST COPY AVAILABLE


MAKING
THE CASE

Conservative estimates suggest that each year, at least four million babies die during the first 28 days of life—almost two-thirds of whom die within the first week and in particular during the first day. In other words, every minute, eight babies die before reaching one month of age. An additional four million are stillborn.



BEST COPY AVAILABLE



**ABOVE** A woman in labor is brought to a local clinic by a bicycle ambulance. MALAWI

## NEWBORN DEATH IS A MAJOR PROBLEM

Deaths during the neonatal period (the first 28 days of life) account for almost two-thirds of all deaths in the first year of life, and 40 percent of deaths before the age of five (see "Two-Thirds Rule," p.13). Current estimates suggest that 34 out of every 1,000 babies born in developing countries die before they reach one month of life.[12]

A disturbing feature of newborn mortality is the marked variation in rates between low-income and high-income countries (Table 1, p.14). For example, the neonatal mortality rate (NMR) in Mali is about 60 per 1,000 live births, compared to Sweden, where the rate is less than 3. The disparity between regions is even wider when we use the lifetime risk of a mother experiencing a neonatal death as the standard of comparison. A mother in western Africa, for example, has an approximately 30 percent risk of one of her babies dying in the first month, compared to a mother in Western Europe or North America where the likelihood is less than one percent. Almost a third of mothers in western Africa have lost at least one newborn baby—a commonplace but largely untold tale of grief.

The neonatal mortality rate (42 per 1,000) and the perinatal mortality rate (76 per 1,000) are highest in Africa, and neonatal mortality is highest of all in western Africa, at 54 per 1,000 live births. Asia actually has a lower average neonatal death rate (34 per 1,000), but because of that region's higher population density, it accounts for 60 percent of the world's neonatal deaths (Table 1, p.14). Preliminary results from a recent analysis found that the loss of healthy life from newborn deaths represented 8.2 percent and 13.6 percent of the burden of disease in sub-Saharan Africa and South Asia, respectively.[13]

It should be noted here that measuring newborn mortality has been difficult (see note, Table 1, p.14). Even so, considerably more information is available today than was the case even a few years ago. Thus, available estimates such as those from the World Health Organization (WHO) indicate the magnitude of the problem rather than provide precise figures.[14]

## HEALTHY NEWBORNS HAVE A HEADSTART IN LIFE

While the alarming number of stillbirths and neonatal deaths is perhaps the most compelling reason to focus on newborns, another important reason is the fact that healthy newborns are likely to enjoy better health in childhood and in later life. Newborns who get off to an unhealthy start, especially low birth weight (LBW) and preterm babies, are particularly vulnerable to illness

and death during their first year. They may also develop disabilities and are generally less likely to reach their full potential, with unfortunate consequences for themselves, their families, and society as a whole.

A growing body of literature suggests that the intra-uterine environment "programs" aspects of chronic disease in adult life.[15-18] The "fetal origins hypothesis" has stimulated much debate and highlighted the importance of promoting in-utero health to prevent problems in later life such as diabetes, hypertension and cardiovascular diseases. This is particularly important as people live longer and these diseases become more common in both the developed and developing world. There is also growing evidence for and interest in the influence of in-utero health on future cognitive development: LBW babies, for example, have been found to do less well than normal newborns on educational and intelligence tests.[19]

## NEWBORN DEATH AND DISABILITY ARE COSTLY

*"This birth has cost me 2,000 rupees, and I have lost a grandson."*

These words from a bereaved grandmother are a harsh reminder that there are economic and social

**DELAY IN SEEKING CARE**

**Chan brought her baby, Sopha, to the health center on the baby's fifth day of life. Chan had noticed that the baby had redness around her umbilical cord from the second day after birth, but she was not able to seek health care because women and newborns are not allowed to leave the home until after the "dropping the stone ceremony"—a ritual symbolizing that the mother and newborn have survived the birthing process. By the time Sopha reached the health center, she had a very high fever and was not feeding. She died the next day, despite treatments with antibiotics.[20] CAMBODIA**

**THE "TWO-THIRDS RULE" ON GLOBAL INFANT MORTALITY RATES***

- More than seven million infants die each year between birth to 12 months
- Almost two-thirds of infant deaths occur in the first month of life
- Among those who die in the first month of life, about two-thirds die in the first week of life
- Among those who die within the first week, two-thirds die in the first 24 hours of life

* This rule applies only to the world average. Local proportions will depend on progress in addressing newborn relative to post-newborn deaths. Historically, as the number of infant deaths has fallen, the proportion of newborns has risen. SOURCE Data based on Hill 1999, WHO 2000, and WHO 2001[21]

BEST COPY AVAILABLE

TABLE 1 **SELECTED NEWBORN AND MATERNAL INDICATORS BY REGION, 1995-2000**

| Region | Estimated number of live births per year (thousands) 1999 | Estimated neonatal mortality rate per 1,000 live births circa 1999 | Number of neonatal deaths (thousands) calculated[a] | Total fertility rate 1995-2000 | Lifetime risk of a mother experiencing a neonatal death (%) calculated[b] |
|---|---|---|---|---|---|
| **AFRICA** | **28,685** | **42** | **1,205** | **5.0** | **21** |
| EASTERN AFRICA | 10,057 | 41 | 408 | 5.8 | 24 |
| MIDDLE AFRICA | 4,107 | 39 | 162 | 6.2 | 24 |
| NORTHERN AFRICA | 4,607 | 32 | 147 | 3.6 | 12 |
| SOUTHERN AFRICA | 1,277 | 18 | 23 | 3.4 | 6 |
| WESTERN AFRICA | 8,636 | 54 | 465 | 5.5 | 30 |
| **ASIA** | **76,090** | **34** | **2,561** | **2.6** | **9** |
| EASTERN ASIA | 21,106 | 20 | 421 | 1.8 | 4 |
| SOUTH-CENTRAL ASIA | 38,442 | 46 | 1,753 | 3.4 | 16 |
| SOUTH EASTERN ASIA | 11,432 | 24 | 277 | 2.7 | 6 |
| WESTERN ASIA | 5,110 | 22 | 110 | 3.8 | 8 |
| **EUROPE** | **7,374** | **6** | **44** | **1.4** | **< 1** |
| EASTERN EUROPE | 3,001 | 9 | 27 | 1.4 | 1 |
| NORTHERN EUROPE | 1,074 | 4 | 4 | 1.7 | < 1 |
| SOUTHERN EUROPE | 1,405 | 5 | 8 | 1.3 | < 1 |
| WESTERN EUROPE | 1,895 | 3 | 5 | 1.5 | < 1 |
| **LATIN AMERICA/CARIBBEAN** | **11,553** | **17** | **196** | **2.7** | **5** |
| CARIBBEAN | 773 | 19 | 15 | 2.6 | 5 |
| CENTRAL AMERICA | 3,427 | 13 | 46 | 3.0 | 4 |
| SOUTH AMERICA | 7,354 | 18 | 135 | 2.6 | 5 |
| **NORTHERN AMERICA** | **4,098** | **4** | **18** | **1.9** | **< 1** |
| **OCEANIA[c]** | **225** | **34** | **8** | **2.4** | **8** |
| **MORE DEVELOPED REGIONS** | **13,045** | **5** | **65** | **1.6** | **< 1** |
| **LESS DEVELOPED REGIONS** | **116,550** | **34** | **3,970** | **4.9** | **17** |
| **WORLD** | **129,596** | **31** | **4,035** | **2.7** | **8** |

[a]Definitions of the indicators and sources of data are listed in the appendix. NMR is based on WHO estimates for 2001 using data collected circa 1999. The number of neonatal deaths was calculated by multiplying the number of live births (1999 estimates) by the NMR (2001 estimates). TFR is from UNFPA 2000.

[b]The lifetime risk of a mother experiencing a neonatal death is calculated by multiplying the neonatal mortality rate by the total fertility rate. This is a simplification of complex statistical interactions between fertility and neonatal deaths, but is used to illustrate the dramatic differences by sub-region.

[c]Japan, Australia and New Zealand have been excluded from the regional estimate but are included in the total for developed countries.

Very few countries in the developing world have a reliable system for registering births and deaths. While surveys by governments and international agencies attempt to estimate the size of the problem, there are many sources of potential error, such as the under-reporting of newborn deaths and stillborns, and inaccuracies in fixing the time of deaths (i.e., classifying neonatal deaths as stillbirths). Other problems include the reluctance of mothers to talk about infant deaths for cultural reasons and the fact that the populations surveyed are often in easy-to-reach, relatively advantaged areas, thus introducing questions of sample bias and a tendency to underestimate the problem.



BEST COPY AVAILABLE

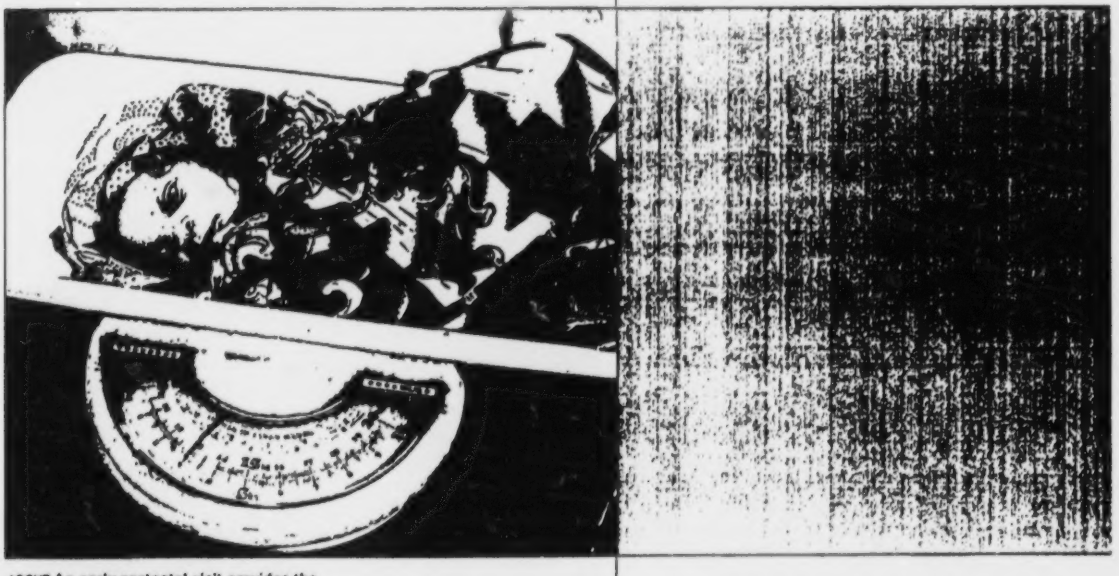
costs associated with poor newborn health. The family incurs the cost of health care during pregnancy and delivery, and if the newborn dies, the additional costs of the funeral and burial. Caring for a disabled or sick child can consume the family budget and, in many cases, is an added burden on family members who would otherwise work and make money. Disabled and sick newborns add to local and national health care costs, stretching already scarce resources. The social costs are harder to quantify. A newborn death is a distressing emotional experience for the new mother and her family, and it is also a social stigma in many cultures.

### NEWBORN SURVIVAL CONTRIBUTES TO LOWER BIRTH RATES, THE HEALTH OF THE MOTHER, AND THE HEALTH OF SUBSEQUENT NEWBORNS

There is evidence of a strong association between newborn and infant mortality and birth interval, with higher mortality for infants born less than 18 months apart.[21] And there is related evidence that when a newborn dies, many mothers are inclined to enter more quickly into another pregnancy in order to provide a "replacement" baby. When a newborn survives, therefore, the mother is more apt to space her pregnancies, thus contributing to her own improved health and the health of her fetus, and by lengthening the birth interval, increasing the survival chances of the next child. At the same time she also contributes to the "demographic transition" from high fertility and mortality to low fertility and mortality.[22]

**STILLBIRTHS**

**Behind closed doors in Mangochi District Hospital, a woman is wailing. Lukia Idrusi has just been told that 32 hours ago she gave birth to a stillborn baby girl. Although Lukia had been anxiously asking about her baby ever since she came round from her operation, neither the nurse in charge nor her grandmother felt that she was well enough to accept the news until now. Lukia had realized that something was wrong almost immediately following the onset of labor. "The labor went on for hours and hours and then I could feel something bursting inside of me. At that point I stopped feeling labor pains," she explains. A clinical examination confirmed that the uterus had ruptured and the fetal heartbeat had stopped.[24] MALAWI**



**ABOVE An early postnatal visit provides the opportunity to promote healthy practices and address complications. MALAWI**

BEST COPY AVAILABLE



18

**WOMEN CAN BE RELUCTANT TO SEEK CARE**

**Mira's baby girl was born in the doorway of her mud-covered stone house with her sister and sister-in-law supporting her. The umbilical cord was cut with a new blade, after which mustard oil was rubbed into the stump. "I didn't go to the health post for check-ups," says Mira, "because I was shy of someone seeing my belly." Even if there had been complications, the family insists that they wouldn't have taken her to the hospital. "We're poor and prefer to die in our own houses," says Madan, Mira's husband. NEPAL**

## IMPROVED NEWBORN CARE WILL LEAD TO REDUCED INFANT AND CHILD MORTALITY

Infant and child mortality rates have dropped significantly over the last two decades through reducing post-neonatal deaths due largely to diarrhea, pneumonia, vaccine-preventable infections and malaria. As a result, neonatal and especially early neonatal deaths now represent a much larger proportion of the overall total infant mortality rate. Further reductions in infant and child mortality will now depend on improving the care of newborns.

In India, for example, infant mortality declined by half between 1960 and 1990.[25] Since then, the infant mortality rate has stagnated (Figure 2) and further reductions will depend largely on national newborn care strategies.

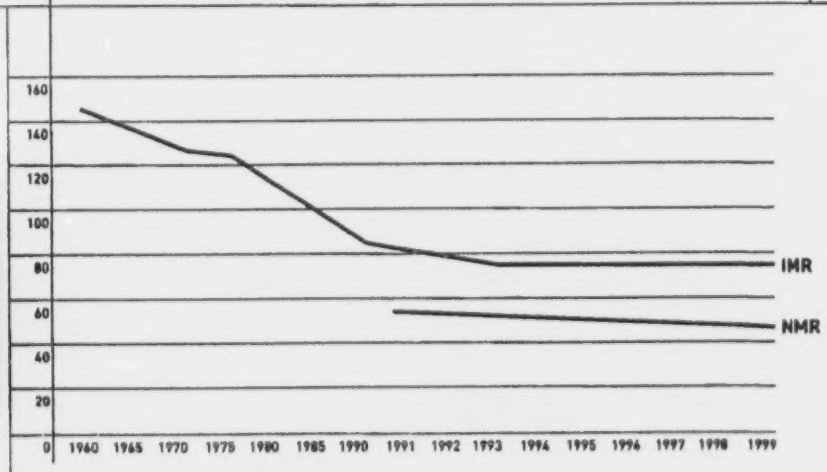
## WHY WE HAVEN'T DONE MORE FOR NEWBORNS

Given such a strong case for improving newborn health, why has the state of newborns not received more attention? To begin with, there is widespread under-reporting of stillbirths and early newborn deaths, which means that policymakers simply do not have the information that would make the problem visible to them. Due to the lack of good data, WHO often uses "models" to estimate the numbers of neonatal and fetal deaths, yielding estimates that may be less than the actual numbers. The cry is rising in the field of neonatal health: Every life counts, so count every birth and death.

In some cultures a birth is not considered "complete" until some time after the first critical days or weeks of life when a ceremony is performed. Until then, mother and

FIGURE 2 **INFANT AND NEONATAL MORTALITY RATES IN INDIA (PER 1,000 LIVE BIRTHS), 1960-1996**

Infant mortality rates have stagnated in India, largely because newborn deaths continue unabated even though post-neonatal deaths have declined.




SOURCE Ministry of Health, India and 'Trends in Childhood Mortality in the Developing World 1960-1996' UNICEF 1999.

- Newborn health *is* a priority in developing countries
- Newborn care does not require high-tech hospital units and specialists
- Newborn care is not just a mother's responsibility
- Newborn care is affordable
- Newborn mortality can be reduced even when socio-economic development has not occurred
- Newborn health is essential for future improvements in child health

baby may be secluded within the home, contributing to the "invisibility" of the newborn.

There is also the widespread, mistaken assumption that the problems of newborns are being addressed by safe motherhood and child survival programs. The reality in many cases is that newborns have benefitted little from the "child survival revolution" and that the neonatal period has for some time been orphaned between these two programs.

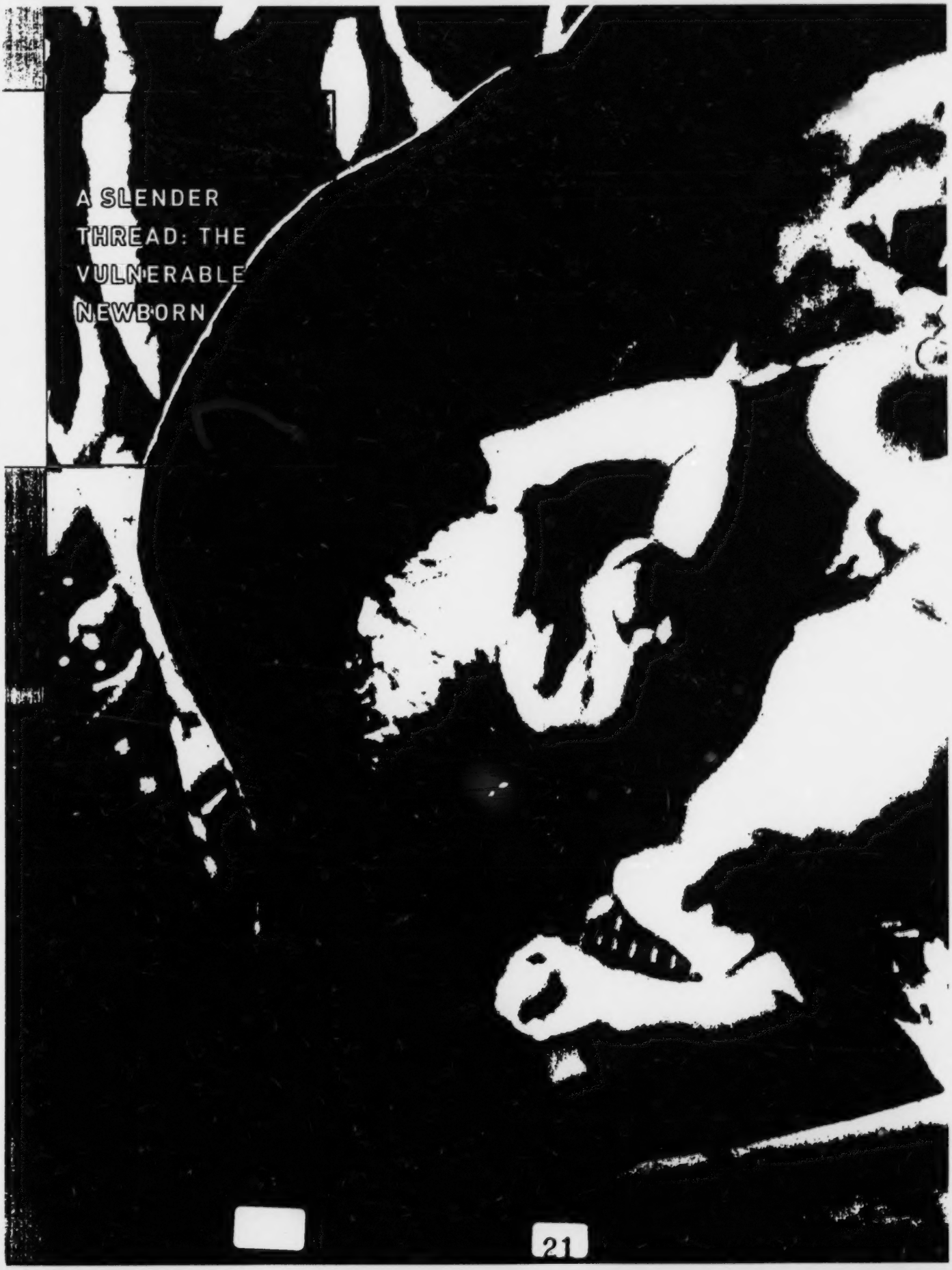
**COST-EFFECTIVE SOLUTIONS EXIST**

If improving newborn health were a matter of making medical or scientific breakthroughs, building expensive health care infrastructures, or purchasing expensive high-tech ventilators and incubators, then the reluctance to take up the cause of newborns might be more understandable. But it is not. Experience in developed nations has shown that neonatal and perinatal mortality rates fell most dramatically long before neonatal intensive care units came into existence, thanks to relatively simple, low-cost interventions such as better maternal and obstetric care, better routine newborn care, and the introduction of antibiotics.

Low-cost, proven interventions can be carried out entirely within the framework of existing maternal and child health programs. Current reviews indicate that essential care during pregnancy, childbirth, and the newborn period costs an estimated US$3 a year per capita in low-income countries.[24]

Improving newborn health is not a matter of developing solutions to the problems; it is a matter of applying existing solutions via existing mechanisms. The real challenge is to spread the awareness of sound newborn health practices to those who need it, especially mothers, other primary caregivers, and health providers. But to do that will require getting the plight of newborns on national and international agendas and finding the resources to put proven solutions into practice.

# A SLENDER THREAD: THE VULNERABLE NEWBORN



We need to do more to improve the survival rate and general health of the world's newborns. The most important reason, of course, is to save lives and ensure the well-being of future generations, but there are other compelling reasons why the plight of newborns merits a prominent place on the international health agenda.

BEST COPY AVAILABLE

**TRADITIONAL BELIEFS AND CLEAN DELIVERY PRACTICES**

**In Cochabamba, Bolivia, birth attendants have traditionally used a stone or a piece of clay pot to cut the newborn's umbilical cord after birth. All attempts to persuade families to use a sterile knife or razor blade failed. Then a study of traditional birthing practices revealed that people living in the region believe that cutting the cord with a knife or blade would cause the baby to grow up to be a thief. Since then, families have been educated to sterilize stones by boiling them, thereby respecting tradition but preventing infection."**
**BOLIVIA**

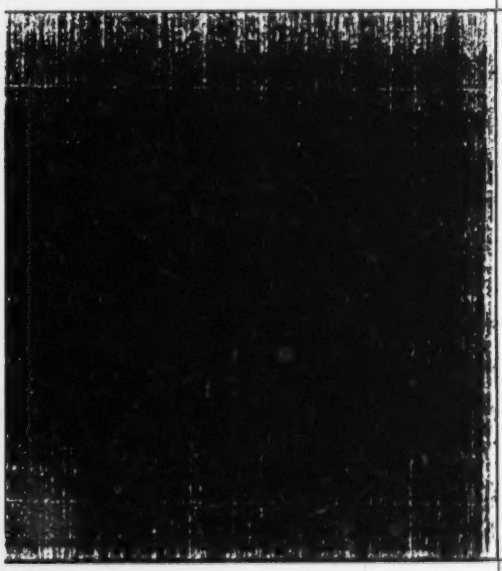
## DIRECT CAUSES OF NEONATAL DEATH

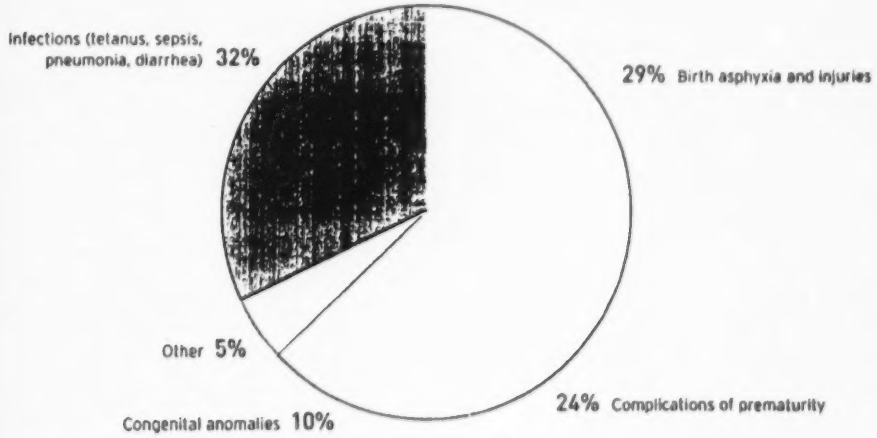
Determining why newborns die in developing countries is difficult because most deaths occur at home, and families are often reluctant to seek outside help for a sick child for a variety of socio-cultural, logistical and economic reasons. The data we have, however, point to four main causes of neonatal death: infections (tetanus, sepsis, pneumonia, diarrhea), complications during delivery (leading to birth asphyxia and birth injuries), congenital anomalies, and complications of prematurity (Figure 3). While this is indeed a sad litany of disease, it is noteworthy—and encouraging—to see that most of these causes of death are readily preventable via proven, low-cost solutions.

Every year, an estimated 30 million newborns acquire a neonatal infection, and between one and two million of those infected die.[28] The most common of these infections lead to neonatal tetanus, sepsis, pneumonia and diarrhea, which together account for 32 percent of neonatal deaths. Where hygiene is poor, newborns may become infected with bacteria leading to serious infections in the skin, umbilical cord, lungs, gastrointestinal tract, brain, or blood. Neonatal tetanus has been eliminated today in over 100 countries through immunizing mothers with tetanus toxoid, ensuring clean delivery practices, and maintaining clean cord care.[29] Early and exclusive breastfeeding also contributes to reduced neonatal mortality from infections.[30]

Another common cause of high neonatal mortality in developing countries is complications during delivery, which lead to asphyxia (the inadequate supply of oxygen immediately before, during, or just after

FIGURE 3 **DIRECT CAUSES OF NEONATAL DEATHS**




Infections (tetanus, sepsis, pneumonia, diarrhea) 32%
29% Birth asphyxia and injuries
Other 5%
24% Complications of prematurity
Congenital anomalies 10%

SOURCE WHO 2001 estimates (based on data collected around 1999).



23

BEST COPY AVAILABLE

birth) and other birth injuries. Prolonged or obstructed labor, a common phenomenon in such countries, is a leading cause of birth asphyxia. The WHO estimates that between four and nine million newborns develop birth asphyxia each year. Of those, an estimated 1.2 million die and at least the same number develop severe consequences, such as epilepsy, cerebral palsy, and developmental delay.[31] Prompt detection and management of obstetric complications can prevent many of these deaths and disabilities.

Congenital anomalies are the fourth most common cause of newborn deaths, a category that includes neural tube defects, cretinism, and congenital rubella syndrome. Neural tube defects are preventable if pregnant mothers are given folic acid during the first three months of pregnancy. Cretinism can be avoided by providing mothers with adequate iodine, and congenital rubella syndrome can be prevented by immunizing mothers against rubella.

**DIRECT CAUSES OF FETAL DEATH**

There are two types of fetal death: fresh stillbirths, which occur within the uterus during labor or delivery, and stillbirths, which occur within the uterus before the onset of labor. The former are caused almost exclusively by a lack of oxygen due to problems during labor, and the latter are most commonly due to maternal infections, such as syphilis, and congenital abnormalities.

**INDIRECT CAUSES OF NEONATAL MORTALITY: THE INFLUENCE OF LOW BIRTH WEIGHT (LBW)**

Birth weight strongly influences the chances of the newborn to survive and thrive. Not surprisingly, LBW (a weight of less than 2,500 grams at birth) is the most important indirect cause of neonatal mortality and morbidity. Between 40 percent and

**ABOVE Low birth weight babies are vulnerable to a range of life-threatening conditions, including infections such as sepsis, pneumonia, and diarrhea. MALAWI**

BEST COPY AVAILABLE

**ABOVE** In many developing countries, girls and women face inequality in access to education, health care, and employment opportunities. INDIA

80 percent of neonatal deaths occur among LBW babies,[31] and those who do survive are subject to poor growth and increased rates of illness from infectious diseases in infancy and childhood, as well as compromised cognitive and behavioral development. WHO estimates that 17 percent of newborns in developing countries suffer from LBW, compared to 6 percent in industrialized countries (see Appendix, Table I for LBW rates by country).

LBW infants have a much greater risk of dying in the newborn period. In a recent study of such infants in Bangladesh, the overall LBW newborn mortality rate was 133 per 1,000 live births. As birth weight decreased, the mortality rate increased: the rate for infants weighing 2,000–2,499 grams was 52 per 1,000; for those weighing 1,500–1,999 grams, 204 per 1,000; and for those weighing less than 1,500 grams, 780 per 1,000. Preterm LBW infants were five times as likely to die as term LBW infants.[32]

LBW is most commonly caused by short gestation, intra-uterine growth retardation (IUGR), or both. However, the causes of LBW are complex, often stemming from the effects of generations of poverty. In general, the health and nutrition of the mother are key factors. The mother's pre-pregnancy weight, for example, influenced by her life-long nutritional status and even that of her mother and grandmother, contributes to LBW, as does a fear of obstructed labor and the related practice of "eating down," the idea held by some mothers that eating less will result in smaller babies, hence easier, and less risky, labor.

LBW can also result from untreated maternal infections—malaria, urinary tract infections, bacterial vaginosis, and sexually transmitted infections (STIs), such as syphilis, gonorrhea, chlamydia,

TABLE 2 **LOW BIRTH WEIGHT BY REGION 1995-99**

| Region | LBW rate (%) 1995-99 | Estimated number of LBW babies per year (thousands) |
|---|---|---|
| SUB-SAHARAN AFRICA | 15 | 3,607 |
| MIDDLE EAST/NORTH AFRICA | 11 | 1,024 |
| SOUTH ASIA | 31 | 11,061 |
| EAST ASIA/PACIFIC | 8 | 2,611 |
| LATIN AMERICA/CARIBBEAN | 9 | 1,031 |
| CEE/CIS AND BALTIC STATES* | 7 | 448 |
| LESS DEVELOPED COUNTRIES | 17 | 19,782 |
| INDUSTRIALIZED COUNTRIES | 6 | 586 |
| WORLD | 16 | 20,368 |

*CEE: Central and Eastern Europe, CIS: Commonwealth of Independent States
Countries grouped by United Nations regions
SOURCE adapted from State of the World's Children 2001, using UNICEF and WHO data 1995-2001

and HIV. Other common causes of LBW include demanding physical work, cigarette use, indoor pollution, and alcohol and drug use. Short spacing between pregnancies also seems to be associated with LBW,[34] as is adolescent pregnancy. Once again, it should be noted that most causes of LBW are treatable or preventable through improving maternal health and nutritional status. Treatment of LBW babies requires special attention, particularly with regard to warmth, feeding, hygiene practices, and prompt treatment of infection.

## GENDER BIAS

Gender bias refers to a preference for male children in some cultures and a corresponding discrimination against and neglect of females. Surveys in some districts of South India, for example, have shown that early newborn mortality among girls is nearly double the rate for boys.[35] Other studies have shown that referrals of girl babies for special care are fewer than for boys. In extreme cases, gender bias can be life-threatening: sex-selective abortion, female infanticide, and the neglect of the girl-child are responsible for an estimated 60 million "missing" girls, mostly in Asia.[36]

*State of the World's Mothers*, a report published by Save the Children in May 2000, presents country-by-country data on indicators reflecting the status of women through their access to health care, education, and economic resources.[37]

# IMPROVING NEWBORN HEALTH

Improving the health of newborns is largely a matter of applying sound health care practices at the appropriate milestones in the development of a newborn: that is, during pregnancy, at the time of birth, and after birth up through the first 28 days. A truly effective approach to newborn health would start even earlier, of course, by addressing the health of future mothers.

BEST COPY AVAILABLE

**BLAME FOR PROBLEMS OFTEN FALLS ON MOTHERS**

**Gopini shows little sympathy for her daughter-in-law who has left for a two-month stay at her mother's house following the stillbirth of her first son. There has always been friction between Gopini and her daughter-in-law, and the death of her grandson only adds to her enmity. She cannot understand why the baby died, since she herself gave birth to a breech baby 20 years ago without problems. "My daughter-in-law was very lazy, she was always sleeping," she says. "Perhaps because of this the baby didn't have enough space to move." NEPAL**

**DEMANDS OF HARD, PHYSICAL WORK CONTINUE THROUGH PREGNANCY**

**Mangala has no idea why she is susceptible to low birth weight, premature babies. If you ask her whether she took care during pregnancy, she is nonplussed. "How can I take care?" she says. "I'm always working, picking rice and pulses (lentils), digging pits and fetching water. I was in the fields until two hours before my baby was born." INDIA**

## CARE OF FUTURE MOTHERS: IMPROVING THE STATUS AND HEALTH OF WOMEN

Small girls grow into small women, who develop into underweight mothers who have undernourished babies, resulting in a cycle of ill health and high death rates.[28] The causes of the undernourishment and ill health of many women are complex. In many societies, girls are uniquely disadvantaged, their options in life limited by illiteracy, poor education, and lack of employment opportunities. They are often burdened with heavy workloads, have lesser claims on scarce resources, and may not be free to make their own decisions regarding access to health care or their own fertility.

Improving the status and health of girls and women is clearly a long-term challenge, one that will require the support of and coordination among individuals in numerous sectors, including health, education, and human rights. Changes in social and cultural beliefs and practices will also be necessary to support needed improvements in the status and health of future mothers.

The ultimate objective is to teach succeeding new generations of girls that their health—and that of their children—will depend on improving nutrition, delaying marriage and childbirth beyond the customary age, and ensuring that they and their partners use safer sexual practices. All of these goals can be furthered by providing educational opportunities for girls.

## CARE DURING PREGNANCY

Caring for newborn babies starts with caring for their pregnant mothers, ensuring that pregnant women are adequately nourished, free from infections and exposure to harmful substances, and monitored for complications during pregnancy. However, the harsh realities of everyday life for many pregnant women make it difficult for them to put these sound recommendations into practice (see Appendix, Table II, Percent of pregnant women with at least one antenatal visit).

### Improve pregnant women's nutrition

A malnourished mother not only endangers the health of her fetus but also her own health, increasing the likelihood of infection and disease. Short-term options for improving the nutrition of mothers include:

- promoting a healthy and varied diet through an adequate supply and equitable distribution of food;
- supplementing pregnant women's diets through food-based or manufactured supplements or fortified foods;
- reducing work loads;
- spacing pregnancies; and
- treating conditions such as malaria and worms.

Over the long term, the nutrition of pregnant women can be improved by studying how these women live. We also need to better understand the demands on their energy and time and to take into account their needs as they perceive them.[29]

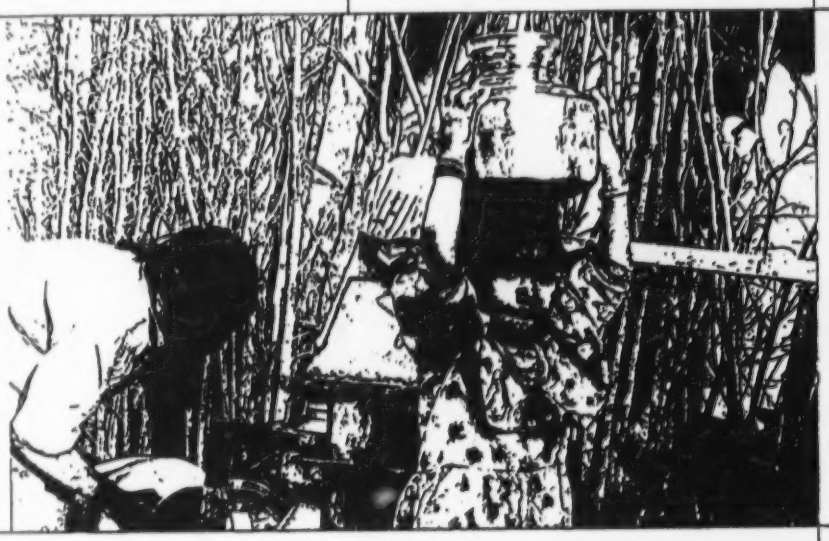
Providing food supplements has been a common component of programs to improve maternal nutrition. In the 1960s and 1970s, there were several attempts to analyze the effect of such programs on neonatal outcomes, but most studies showed relatively small effects on birth weight and perinatal mortality. The cost-effectiveness of these approaches was also called into question, and further troubles arose over claims of "culture clash," referring to situations where women chose to restrict eating in the belief that having a smaller baby would contribute to a safer and easier birth. For these reasons, food supplementation programs were largely discredited and never introduced on a broad scale.



29

BEST COPY AVAILABLE

- Improve the health and status of women
- Improve the nutrition of girls
- Discourage early marriages and early childbearing
- Promote safer sexual practices
- Provide opportunities for female education



A recent study from the Gambia, however, has reopened the debate. Undernourished pregnant women were given supplements in the form of a groundnut-based biscuit that provided an extra 900 calories per day and added calcium and iron. The women also received prenatal care, including iron and folate supplements, tetanus toxoid immunization if needed, and chloroquine during the malaria season. Overall, there was a 35 percent decrease in LBW babies and a 49 percent reduction in perinatal deaths among women receiving supplements compared with those who did not.[46]

Increasing the intake of vitamins and micronutrients during pregnancy has also produced promising results. Recent studies of interventions to reduce anemia in pregnancy have demonstrated the beneficial effects of iron and folate supplements, along with anti-worm treatment.[41] In one study, adding iodine to a water supply in China reduced neonatal mortality by approximately 50 percent.[47] Other studies suggest that zinc supplements during pregnancy improve infant outcomes, particularly among LBW infants.[43,44] Supplementation of women of reproductive age in Nepal once weekly with vitamin A reduced pregnancy-related maternal mortality by 40 percent, and modestly reduced maternal morbidity and anemia.[48] In other studies, maternal night blindness, indicative of vitamin A deficiency and present in 10-20 percent of women in some populations, was associated with more severe infections, anemia, increased infant deaths, and increased risk of maternal mortality for up to two years after giving birth.[44] Although maternal vitamin A supplementation did not impact infant mortality through 6 months of age, vitamin A supplementation of newborns immediately after birth may be a promising strategy.[47,48]

Ideally, the broad use of food and vitamin supplements to improve maternal nutrition should be part of a wide-scale development effort aimed at alleviating poverty, ensuring household food security, promoting healthy diets, and defending gender equity. In those cases where supplements are the only intervention, however, the most important supplements to include in an antenatal care package are iron and folate, and, in some regions, vitamin A, iodine, and zinc. The use of multiple micronutrient supplements during pregnancy, a common practice in the industrial world, is now undergoing evaluation in several developing countries.

Adding micronutrients (such as iron, vitamin A, and iodine to fortify flour and other staples) can be a simpler and quicker means of improving nutritional status than changing diets. However, for this strategy to be effective, fortified foods must be readily available, relatively inexpensive, and widely consumed by the target population.

**Immunize against tetanus**

As noted earlier, neonatal tetanus is an important cause of newborn death. Tetanus toxoid vaccination protects women against tetanus infection

BEST COPY AVAILABLE

**CONTROLLING MALARIA AND OTHER INFECTIONS IMPROVES BOTH MATERNAL AND NEWBORN HEALTH**

**In the past five years, 28-year-old Margaret Edward has lost two children to malaria before their third birthday. Now, Margaret clutches her newborn baby girl to her chest, praying that malaria will not take this child too. But this time she needn't worry.**

**Five weeks ago, Margaret herself came down with malaria in the third trimester of her pregnancy, but fortunately a vigilant traditional birth attendant spotted the signs and sent her to the local district hospital. Thanks to prompt diagnosis and treatment, Margaret has delivered a healthy baby. MALAWI**

during pregnancy and ensures that mothers pass this immunity to their unborn children. In this way, babies are protected against tetanus during the first two months of life, up to the age when they themselves can be immunized against the disease. Where possible, immunization programs should be initiated as early as adolescence.

Tetanus toxoid is one of the cheapest, safest, and most effective vaccines. It costs about US$1.20—a sum that includes the purchase and delivery costs of three doses of vaccine. Three doses of tetanus toxoid ensure 10–15 years protection for a woman and immunity for her newborns during the critical first two months of life. Five doses ensure a lifetime of protection for the mother.[49] Yet only about 52 percent of pregnant women in developing countries are now fully immunized (see Appendix, Table II, Percent of pregnant women with at least two toxoid immunizations).[50] This is one proven intervention that we need to more effectively implement.

**Screen and treat infections**

Infections during pregnancy are a major cause of complications, such as spontaneous abortions, premature rupture of fetal membranes prior to labor, preterm birth, and congenital infection and anomalies. Prevention and treatment should be part of antenatal care.

**Sexually transmitted infections** Gonorrhea can cause infant blindness, while active syphilis is associated with spontaneous abortions, a high rate of perinatal death, and other conditions, including developmental delay. Testing for sexually transmitted infections and providing appropriate treatment should be included in all antenatal care. In most developing countries, screening and treatment for syphilis is simple and inexpensive, with significant payoffs for newborn health.

**Malaria** In regions where it is highly endemic, malaria may cause up to 30 percent of preventable LBW and 3–5 percent of neonatal mortality. Malaria is also associated with an increased risk of spontaneous abortions and stillbirths and is linked with maternal anemia. These complications can be reduced by providing intermittent presumptive treatment during antenatal visits.[51] Use of bednets impregnated with insecticide has also been proven to be effective in preventing malaria.[52]

**Improve communication and counseling**

Families and communities can find solutions to make birth safer and establish a referral and transport plan if emergencies arise during labor. Counseling can help the pregnant woman and her family take steps to:

- ensure skilled care at the birth
- select a place of birth according to anticipated pregnancy complications
- learn danger signs and when and where to seek care
- highlight the advantages of early and exclusive breastfeeding
- alert the mother to any obstacles that might make it difficult to ensure a safe delivery

## SPECIAL ATTENTION

**Monitor and treat pregnancy complications**

Many pregnancy-related complications could be managed appropriately if they were detected in time. Anemia, for example, can often be prevented with iron and folate supplements; urinary tract infections, reproductive tract infections, and maternal hypertension/preeclampsia can be treated. However, cases of severe intra-uterine growth retardation (IUGR), malpresentation or abnormal lie of the fetus, and multiple pregnancies should be referred to facilities better equipped to deal with problematic births and LBW newborns. A woman with a history of serious obstetric or medical complications should also be monitored closely.

Obstacles that keep pregnant mothers away from antenatal services need to be identified and overcome. Many factors could discourage women from taking advantage of maternal health care, such as dissatisfaction with the attitude of staff, the time, costs, and difficulties associated with reaching the service location, and the preference of many women to be seen only by a female health worker.

Problems are often compounded by some women's natural shyness and the belief that pain is a natural part of pregnancy and birth. "I had



BEST COPY AVAILABLE

pain, strong stomach pain and couldn't sleep," a mother in rural India noted, speaking of the premature birth of twins who died soon after delivery. "The next day the pain was still there. I plastered the house hoping the pain would go, but I did not tell anyone. I thought maybe this was normal."

**Promote voluntary counseling and testing for HIV**

Counseling would also be appropriate where voluntary testing for HIV is available. This would include providing infant-feeding counseling for mothers living with HIV/AIDS so that they can make informed decisions about feeding alternatives.*

**Reduce the risk of mother-to-child transmission (MTCT) of HIV**

Up to one-third of untreated HIV-positive mothers will transmit the virus to their infant in the perinatal period.[53] While AZT [an anti-HIV drug] given during pregnancy has been shown to reduce mother-to-child transmission, families in many developing countries cannot afford this intervention. Shorter courses of treatment with AZT or Nevirapine around the time of delivery might be a more realistic solution,[54] provided that the resources are available.

The decision of whether and how to address mother-to-child transmission of HIV requires careful thought and discussion. For any approach to work, women would need to know their HIV positive status, in order to be informed about how to provide proper care for themselves and their babies.

**WOMEN NEED SPECIAL ATTENTION DURING PREGNANCY AND CHILDBIRTH**

**Surakha and her husband Vasant, from the Bodli village in Gadchiroli district, India, regret not attending antenatal checkups. Their son died at birth. Surakha wishes now she had taken the bus to the clinic 10 kilometers away. "If I'd gone for checkups we would have known the delivery could be difficult and gone to hospital," she says. But the fact is that when a pregnancy seems to be entirely normal, most rural women are reluctant to take time away from working in the fields. Four months after their son died, Surahka discovered that she was pregnant once again. This time Vasant has already accompanied his wife for an antenatal check at the hospital, and they plan to go again. Putting food on the table is only one thing a father can do. A man involved with the well-being of his children—even before the day they are born—is making a valuable investment in the future. INDIA**

**CARE DURING PREGNANCY**

- Improve the nutrition of pregnant women
- Immunize against tetanus
- Screen and treat infections, especially syphilis and malaria
- Improve communication and counseling: birth preparedness, awareness of danger signs, and immediate and exclusive breastfeeding

**Special Attention**

- Monitor and treat pregnancy complications, such as anemia, preeclampsia, and bleeding
- Promote voluntary counseling and testing for HIV
- Reduce the risk of mother-to-child transmission (MTCT) of HIV

*The complex issues of HIV and reproductive health are beyond the scope of this report. For more in-depth information, see the SARA Project publication: Prevention of mother-to-child transmission of HIV in Africa: practical guidance for programs. Washington, DC: AED, May 2001.

BEST COPY AVAILABLE

Decision-makers must also consider the social effects of new policies, such as isolation of or violence against women who are identified to be HIV positive, and the possibility of increased infant deaths caused by the high rate of infections often associated with the use of breast milk substitutes.

## CARE AT TIME OF BIRTH

**Ensure skilled care at delivery**

Historically, skilled care at delivery has been associated with lower neonatal death rates (Figure 4).[55] Skilled attendants at birth are defined as "people with midwifery skills (e.g., doctors, midwives and nurses) who have been trained to proficiency in the skills to manage normal deliveries, and diagnose and manage or refer complicated cases."[56] Skilled care providers may practice in facility or household settings and require a functioning referral system for the management of complications.

A primary barrier to delivering proper obstetric care in developing countries is that on average 63 percent of births occur in the home and only 53 percent of all births are attended by a health worker skilled in delivery care.[57] In other words, 53 million women each year give birth without the help of a professional.[58] In some countries the incidence of skilled care at deliveries is much lower; two percent in Somalia, for example, and nine percent in Nepal. Even in those cases where skilled health care is available, ongoing training and supervision of personnel and quality referral care for obstetric emergencies must be ensured.

Several randomized controlled trials have shown the value of a supportive companion in reducing the length of labor, producing fewer instrumental deliveries, and having a positive impact on Apgar scores (scores used to evaluate the condition of the newborn baby).[59] These findings emphasize that the attitude of those attending the birth is an important factor along with the skill of the professional birth attendant, suggesting that personal support and skilled assistance in delivery are important to women in labor.

**Provide for clean delivery**

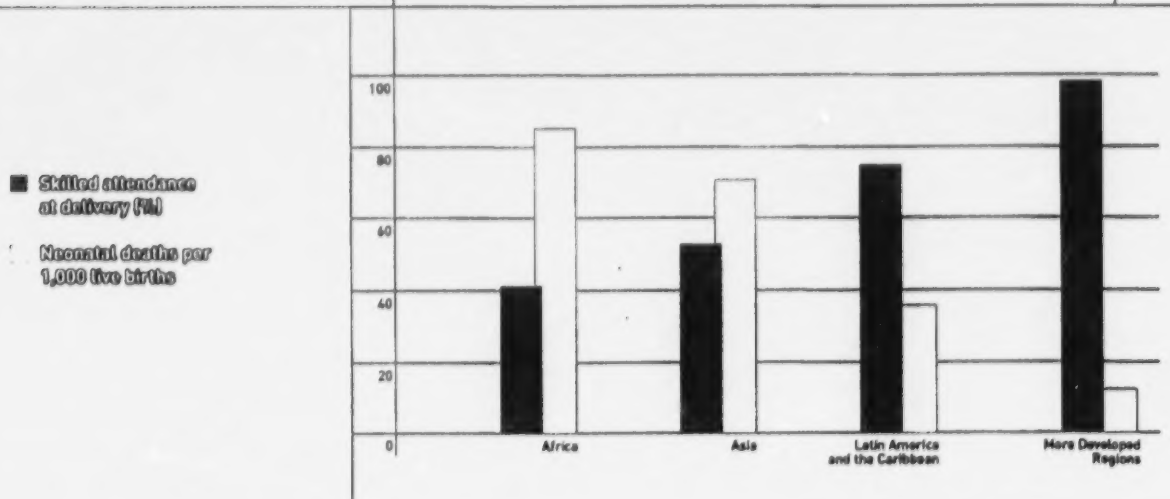
A clean delivery is crucial to prevent infection of the newborn and of the mother. The standard message is to maintain a "clean chain" by ensuring clean hands, clean surfaces, clean cord-cutting and tying, and a clean cloth to wrap the newborn.

The use of a clean delivery kit helps to promote cleanliness at birth. Most clean delivery kits include soap, a plastic sheet for delivery, a clean blade, and a cord tie.

**Keep the newborn warm**

A newborn baby regulates body temperature much less efficiently than does an adult and loses heat more easily, particularly from the

FIGURE 4 **SKILLED CARE AT DELIVERY AND NEWBORN MORTALITY BY REGION**




SOURCE WHO estimates 2001

## CARE AT TIME OF BIRTH

- Ensure skilled care at delivery
- Provide for clean delivery: clean hands, clean delivery surface, clean cord cutting, tying and stump care, and clean clothes
- Keep the newborn warm: dry and wrap baby immediately, including head cover, or put skin-to-skin with mother and cover
- Initiate immediate, exclusive breastfeeding, at least within one hour
- Give prophylactic eye care, as appropriate

**Special Attention**

- Recognize danger signs in both mother and baby and avoid delay in seeking care and referral
- Recognize and resuscitate asphyxiated babies immediately
- Pay special attention to warmth, feeding, and hygiene practices for preterm and LBW babies

head. A naked newborn, for example, exposed to an environmental temperature of 23°C (73.4°F) suffers the same heat loss as a naked adult at 0°C (32°F),[48] and the loss is greater still in LBW babies, especially if they are left wet and uncovered. Hypothermia in the newborn occurs in all climates and is due to a lack of knowledge or practice, not a lack of equipment.

Wherever the birth takes place, it is important to maintain a "warm chain" immediately after birth and during the following hours and days. The place where the birth occurs must be warm (at least 25°C/77°F) and free of drafts, though ventilated.

At birth, the newborn should be immediately dried and covered, including the head. While being dried, the baby should be placed on the mother's chest or abdomen to keep it warm. In some countries, the newborn baby is left uncovered until the placenta is delivered, a practice that considerably increases the risk of hypothermia. Skin-to-skin or close contact with the mother is the best way to keep the baby warm. Another advantage of continued close contact between newborn and mother is that it encourages breastfeeding on demand. Breastfeeding within one hour of delivery provides the baby with calories to produce body heat and of necessity keeps the baby close to the mother and warm. Bathing is generally not necessary on the first day and should be postponed until the baby is stable.

**Initiate exclusive breastfeeding**

Immediate breastfeeding is one of the most effective interventions; it provides nutrients, warmth, and

**TRAINING FOR TRADITIONAL BIRTH ATTENDANTS**

**A TBA who has assisted women during birth over four generations, recalls how in the old days she would pour thick warm gruel over a child immediately after delivery, cut the umbilical cord with a sickle, and check the newborn's hearing by hitting a steel vessel with metal near her ear. Then she would massage the head into shape. These days, she washes her hands with soap and disinfectant before and after delivery, uses sterilized scissors to cut the cord, and cleans the mother and child with a clean cloth. She is also trained in resuscitation skills. INDIA**

BEST COPY AVAILABLE

**ACCESS TO HEALTH CARE FACILITIES**

**"I'd been in labor for six hours when the TBA said I should go to hospital because the baby was breech. Luckily a relative had a vehicle and as I arrived at the hospital the baby started to be born. Without this vehicle, who knows what would have happened." MALAWI**

**CLEAN DELIVERY KITS**

**Seventeen-year-old Bimala was assisted in the birth of her son by her sister-in-law who is a trained birth attendant. "We used the clean delivery kit, which included a thread, a knife and a plastic sheet. Usually the baby isn't wrapped up until the placenta comes out, but my sister-in-law told me to wrap him up straight away because it's so cold up here in the hills." NEPAL**

immunological protection for the baby; promotes bonding; and reduces postpartum hemorrhage. One of the most important services that can be provided to the mother is preparation for and support during breastfeeding. WHO recommends that newborn babies should be put to the breast within one hour after birth and should not go without breastfeeding for longer than three hours. In May 2001, the World Health Assembly adopted a resolution which set the optimal duration of exclusive breastfeeding at six months.[41]

**Give prophylactic eye care if appropriate**

Some newborns run the risk of becoming blind from gonorrhea or chlamydia infections acquired from the mother. Applying antibiotic ointment to the baby's eyes within an hour of birth can prevent this.

**SPECIAL ATTENTION**

**Recognize danger signs and avoid delay in seeking care and referral**

It is crucial to identify maternal and newborn complications early and transport the mother and/or baby to an appropriate facility. There are four types of delay widely recognized as contributing to maternal and perinatal mortality:[42]

- delay in recognizing danger signs;
- delay in deciding to seek care;
- delay in getting care due to lack of transport or money; and
- delay in receiving quality, appropriate care after arriving at a health facility.

**CARE AFTER BIRTH**

- Ensure early postnatal contact
- Promote continued exclusive breastfeeding
- Maintain hygiene to prevent infection: ensure clean cord care and counsel mother on general hygiene practices, such as hand-washing
- Provide immunizations such as BCG, OPV, and hepatitis B vaccines, as appropriate

Special Attention

- Recognize danger signs in both mother and newborn, particularly of infections, and avoid delay in seeking care and referral
- Support HIV positive mothers to make appropriate, sustainable choices about feeding
- Continue to pay special attention to warmth, feeding, and hygienic practices for LBW babies

**Recognize and resuscitate asphyxiated babies immediately**

In developing countries, there are an estimated four to nine million cases of birth asphyxia each year, resulting in almost 1.2 million neonatal deaths,[43] many of which could be prevented with prompt resuscitation.

There is evidence to suggest that the wider use of resuscitation techniques for asphyxiated babies, such as low-tech mouth-to-mouth resuscitation, is possible in developing country settings, even during home births. A study from Sweden found that almost 80 percent of newborns who needed to be resuscitated could be treated with no more than bag-and-mask intervention,[44] as opposed to requiring more complex interventions, such as intubation, chest compression, or drugs. Similarly, related research has also demonstrated that in most cases, newborns can be revived just as effectively with air as with oxygen,[45] a welcome finding for under-resourced district hospitals, health centers, and private homes where supplemental oxygen is not available. WHO has recently introduced a simple tube-and-mask method for use in primary care centers and in the home, but further studies are needed on its cost-effectiveness and utility during and adaptation for prolonged resuscitation efforts.

**Pay special attention to preterm and low birth weight babies**

There are a number of ways to help prevent death from preterm births (those occurring before 37 weeks of gestation). One is to detect and treat urinary and reproductive tract infections, which can lead to giving birth before term.

Another is to ensure that the birth takes place in a hospital that is equipped to deal with preterm births. Preterm babies have a better chance of surviving in such hospitals because staff can diagnose the premature rupture of membranes and premature labor, and various drugs are more readily available, such as those which suppress labor and corticosteroids (drugs to mature the lungs of the unborn child and prevent respiratory distress in babies). When access to a hospital is not possible, simple measures such as keeping the baby warm, preventing infection by ensuring that caregivers frequently wash their hands, and frequent feeding (breast or expressed milk given by tube, spoon, or in a cup if the baby is unable to suck) may go a long way to reducing deaths among babies born before term.

Like preterm babies, LBW babies need special care, particularly with regard to warmth, feeding, hygiene practices, and promptly recognizing the danger signs of infection.

One effective approach used in the care of both preterm and LBW babies is "kangaroo mother care," which encourages breastfeeding and provides continuous warmth for the baby. Based on continuous skin-to-skin contact by laying the baby directly on the mother, the method can be effective, as long as the baby is stable and its signs are monitored carefully, and the baby can feed on demand.[46]

**BREASTFEEDING BEHAVIORS CAN BE CHANGED**

LINKAGES, a USAID-funded project, works with Ministries of Health, PVOs, NGOs and other partners to promote breastfeeding by encouraging individuals to carry out small "doable actions," by enlisting the support of families and communities, and by building a critical mass of breastfeeding advocates at the national and regional levels to lay the groundwork for community programs.

Before LINKAGES, baseline data painted a bleak picture. In Madagascar, for example, one in two infants were given water, fluids, or other foods before the age of six months instead of only breastmilk. In Ghana, only 25 percent of women initiated breastfeeding within the first hour after birth, and only 31 percent exclusively breastfed their babies. In the Indian states of Bihar and Uttar Pradesh, most mothers delayed the start of breastfeeding for more than 24 hours, and many mothers introduced liquids too early and soft foods too late—feeding practices which lead to increases in infant morbidity and mortality.

With the right intervention, breastfeeding behaviors can change quickly and dramatically. Within six to nine months, the LINKAGES program doubled early initiation of breastfeeding in Madagascar (from 34 percent to 73 percent) and Ghana (from 25 percent to 50 percent). The program also increased the rates in Bolivia from 39 percent to 64 percent and in India from less than 1 percent to 22 percent (in the World Vision/LINKAGES project sites). Equally dramatic were the increases in exclusive breastfeeding, which went from 46 percent to 68 percent in Madagascar, from 31percent to 68 percent in Ghana, and from 12 percent to 28 percent in CARE/LINKAGES project sites in India.[47]

## CARE AFTER BIRTH

The basic, low-cost principles of newborn care are still as relevant today as they were almost a century ago when the French obstetrician Pierre Budin spelled them out in his classic work, *The Nursling*.[48] All newborns require breathing, warmth, food, hygiene,

BEST COPY AVAILABLE

TABLE 3 **SELECTED NEWBORN AND MATERNAL HEALTH SERVICE AND PRACTICE INDICATORS BY REGION, 1995-2000**

| Region | Antenatal care (at least one visit) (%) 1995-99 | Tetanus toxoid coverage in pregnant women (%) 1997-99 | Skilled attendance at delivery (%) 1995-2000 | Exclusive breastfeeding aged 0- 4 months (%) 1995-2000 |
|---|---|---|---|---|
| SUB-SAHARAN AFRICA | 65 | 42 | 37 | 34 |
| MIDDLE EAST/NORTH AFRICA | 65 | 55 | 69 | 42 |
| SOUTH ASIA | 51 | 69 | 29 | 46 |
| EAST ASIA/PACIFIC | 81 | 34 | 66 | 57 |
| LATIN AMERICA/CARIBBEAN | 84 | 51 | 83 | 37 |
| CEE/CIS AND BALTIC STATES | - | - | 94 | - |
| INDUSTRIALIZED COUNTRIES | 99 | - | 99 | - |
| WORLD | 69 | 51 | 56 | 44 |

Definitions of the indicators and sources of data are listed in the Explanatory Notes of Table II in the Appendix. A dash ("-") indicates that an average could not be calculated for that region as more than 25% of countries had missing data.

**EFFORTS TO PREVENT MOTHER-TO-CHILD TRANSMISSION OF HIV IN MALAWI**

**On average 16 percent of pregnant women in Malawi who have been tested in the antenatal period are infected with HIV. Consequently, there is an urgent need to counsel women in relation to reproductive health and feeding practices. CHAPS (Community Health Partnerships) has designed a voluntary counseling and testing (VCT) program that will be available through the Baby-Friendly Hospital Initiative (BFHI). The government of Malawi has given the go-ahead to the drug Nevirapine which prevents replication of the virus causing infection in the mother's blood and breastmilk. At a cost of US$4 per woman and requiring just two doses (one for the mother when she goes into labor and one for the baby 72 hours after birth), it has been shown to reduce the transmission rate by half. However, the cost-effective use of Nevirapine still depends on an effective VCT program, since only mothers known to be HIV positive will be given the drug. Unfortunately, most poor African women are out of reach of facilities that can provide testing and treatment. MALAWI**

love, and prompt treatment of illness.

**Ensure early postnatal contact**

Since so many deaths occur within the first hours or days after birth, early postnatal contact is key to newborn health and survival. This includes counseling on newborn care practices and recognizing, managing, and referring problems that need special attention. Appropriate follow-up must also be ensured.

**Promote continued exclusive breastfeeding**

A recent review has demonstrated the substantial benefits of exclusive breastfeeding over substitute feeding or partial breastfeeding, showing, among other things, that early and exclusive breastfeeding reduces neonatal mortality from infections.[69,70] But exclusive breastfeeding is still the exception rather than the rule in many countries. Over 80 percent of all newborn infants in South Asia, for example, are not put to the breast at all in the first 24 hours, and colostrum (the "first milk" from the mother with potent immune defense properties) is widely discarded.[71] Rates for early breastfeeding are much lower in some countries, 10 percent or less, and rates for exclusive breastfeeding for the first three months are lower still (see Appendix, Table II for country-specific data).

Evidence clearly shows that the rates of early and continued exclusive breastfeeding can both be increased. In one study of home-based support for mothers in Mexico, exclusive breastfeeding increased among mothers who received counseling in the hospital and during follow-up home visits.[72] In a similar study of peer counselors in Bangladesh, early and extended breastfeeding increased after expectant and new mothers received counseling in the home.[73] Recent evidence from the LINKAGES Project in Ghana, Madagascar, and India has also shown that well-designed com-



BEST COPY AVAILABLE

munity-based behavior change interventions can produce dramatic increases in immediate and exclusive breastfeeding.[74] The UNICEF Baby-Friendly Hospital Initiative has also succeeded in increasing rates of breastfeeding in hospitals.

**Maintain hygiene to prevent infection**
Neonatal infections account for about one-third of neonatal deaths in developing countries. Early and exclusive breastfeeding, clean hands, and proper cord care are the basic principles for preventing infections, but they are still not practiced on a large scale.

**Provide immunizations**
WHO recommends birth doses of BCG and oral polio vaccines (OPV). Hepatitis B vaccine should also be given where perinatal transmission of hepatitis B is frequent, as in South Asia.[75]

## SPECIAL ATTENTION

**Recognize danger signs and avoid delay in seeking care and referral**
Caregivers are in a position to observe danger signs in the newborn. Many of these danger signs are difficult to recognize, however, so caregivers need to be alert to a variety of abnormal infant behaviors and physical signs, such as changes in levels of activity or alertness, breathing and feeding difficulties, floppy limbs, convulsions, abnormal temperature, jaundice, pale skin, bleeding, vomiting, or a swollen abdomen.

**Support HIV positive mothers to make appropriate, sustainable choices about feeding**
In recent years, the advice of exclusive breastfeeding has come up against the reality of the risk of HIV transmission through breast milk. While the risk is real, so is the risk associated with the alternative, mixed feeding. A study in developing countries with 25 percent prevalence of HIV estimates the risk of transmission of HIV through breastfeeding at less than four percent.[76] A study in Durban, South Africa, meanwhile, suggests that exclusive breastfeeding has a reduced risk of transmission compared with mixed feeding, i.e., breastfeeding supplemented with breast milk substitutes.[77]

The best approach in these areas is to provide voluntary counseling and testing (VCT) where possible. Only when replacement feeding is safe, acceptable, feasible, affordable, and sustainable should alternatives to breastfeeding by HIV-infected mothers be recommended. Otherwise, exclusive breastfeeding should be considered during the first six months of life.

**LBW babies**
LBW and preterm babies continue to require special attention during the postnatal period as described on p. 33.

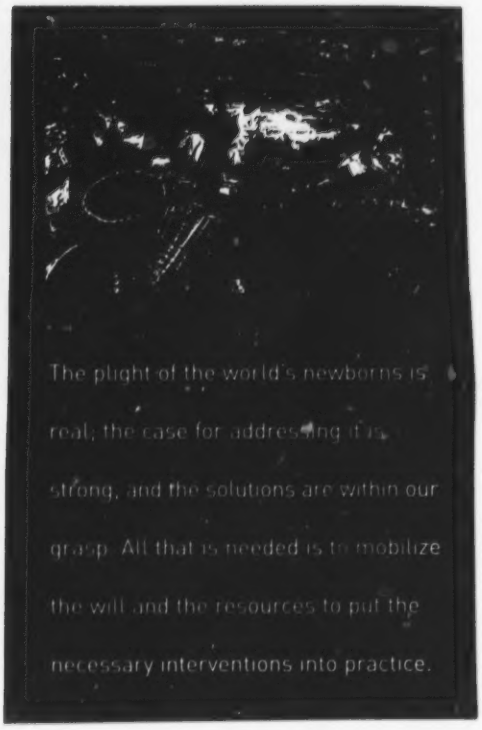
## MONITORING PROGRESS IN NEWBORN HEALTH

A number of health status and process indicators have been proposed for monitoring progress in improving newborn health and survival. Commonly used indicators include neonatal mortality rate, antenatal care coverage, the percentage of all births attended by skilled health workers, tetanus toxoid vaccination coverage, and the proportion of mothers who exclusively breastfeed their babies (see Table 3; for country-specific data, see Appendix, Table II). However, information on postnatal care is rarely collected. Measuring the proportion of mothers and newborns who have early postnatal contact will go a long way to help ensure that healthy practices are promoted and complications recognized and addressed.

BEST COPY AVAILABLE

# THE WAY FORWARD: SAVING NEWBORN LIVES

BEST COPY AVAILABLE



The plight of the world's newborns is real; the case for addressing it is strong, and the solutions are within our grasp. All that is needed is to mobilize the will and the resources to put the necessary interventions into practice.

BEST COPY AVAILABLE

## THE WAY FORWARD: SAVING NEWBORN LIVES

The plight of the world's newborns is real; the case for addressing it is strong; and the solutions are within our grasp. In recent years, childhood deaths have been reduced through major public health interventions; now it's time to focus on expectant mothers and their newborns. A healthy start in life leads to healthier and more productive children and adults. It is key to meeting the global development goal, agreed upon by the international development community, to reduce by two-thirds the death rates of infants and children under the age of five years in developing countries. Because neonatal death rates have been stagnant and newborn deaths now account for two-thirds of infant deaths, substantial progress towards this goal will clearly depend on improving newborn health.

Change is possible. In closing, we offer several recommendations to help guide international and national strategies for improving newborn survival and well-being.

**Increase commitment to newborn health.** Improving newborn health is equally a matter of practice and policy, and in most cases the latter must be in place to drive the former. If newborn care programs are to receive the support they need—the kind of support currently available for reproductive health, child health, and communicable disease prevention, for example—they will need to receive more commitment and resources and to figure more prominently in national health plans and health reform programs. To create a favorable policy environment conducive to and supportive of newborn health, advocacy will be needed at professional, local, national, and international levels.

To translate policy into practice, a commitment must be made to provide adequate financial resources as well as to increase the quantity and quality of staff with relevant skills. In addition to the need for incremental national budget allocations, the international donor and NGO community should be encouraged to support efforts to take to scale both established and innovative interventions proven to be cost-effective on a small scale.

### TRAINING AND PLACING VILLAGE MIDWIVES

In 1993, Indonesia embarked on an ambitious village midwife program, Bidan di Desa (BDD), that trained and placed more than 54,000 midwives with the aim of making family planning and maternity care accessible to all women. These village midwives complete a four-year training program, which includes three years of nursing school plus one year of a midwifery program. They are expected to have midwifery skills for managing normal pregnancies and deliveries; identifying, stabilizing and referring complications; and providing basic care of newborns. Given that so many women remain at home for labor and delivery, the village midwives are encouraged to visit them in the home throughout the pregnancy and postpartum time and to attend home deliveries.

Village midwives are hired on three-year renewable contracts in almost every village in the country. They are frequently the only source of maternal, child, and basic health care. Between 1994 and 1997, the proportion of births attended by a village midwife increased from 34 percent to 40 percent nationally and to almost 65 percent in parts of Java and Bali. Moreover, 80 percent of women now consider village midwives to be an appropriate source of family planning information. This demonstrates a rising level of acceptance of the village midwife as a provider of reproductive health services.[A7] INDONESIA

BEST COPY AVAILABLE

**Begin care for newborns with care for mothers.** A newborn's chance of survival and well-being begins well before birth, with the health and nutritional status of the mother and preparation for a safe delivery. A continuum of care, beginning before birth, should include antenatal care and safe delivery, followed by health visits for both mother and baby to ensure good newborn care practices, and the identification and appropriate management of complications. A healthy start requires nutritional support to pregnant women, treatment of infections such as malaria and syphilis, birth preparedness, skilled care at delivery, recognition of danger signs, and prompt treatment of obstetric complications.

Programs also need to address the cultural, social, and economic barriers that may inhibit women's access to information and services, emphasizing community and home-based approaches and the involvement of husbands and other family decision-makers. Improving education and employment opportunities will have the greatest long-term impact on the status of women.

**Integrate newborn care into existing safe motherhood, child survival, and other programs.** Newborn care efforts do not have to be started from scratch. Rather than being initiated independently, interventions to improve newborn health (before, during, and after birth) should be folded into already established programs, and can be linked particularly effectively with safe motherhood and child survival. Those interventions with demonstrated effectiveness include tetanus toxoid immunization, skilled care at delivery, breastfeeding support, hygienic practices, and thermal control.

Most countries also have a variety of other programs that could easily accommodate an added emphasis on health care for newborns. Programs that encourage improved maternal nutrition, screen for sexually transmitted infections (STIs), expand immunization coverage, provide family planning services, or promote improved reproductive health are all candidates for the integration of a newborn health component.

For the most part, this integration does not have to be complicated. An early postnatal visit can be added to safe motherhood programs to benefit both the new mother and her baby; child health programs can begin to address the newborn as well as the older child; STI and malaria control programs can do a better job of reaching expectant mothers; and family planning services offer a natural platform for encouraging adolescent women to delay childbearing and new mothers to space their pregnancies at least two years apart.

**Develop and replicate promising program innovations.** In addition to strengthening and expanding the newborn component of existing programs, promising new programs to improve newborn health and survival need to be further refined, tested, and replicated. The program innovation may be a new cadre of health worker, an approach (such as the positive deviance method used by SC in Vietnam), a new technology, or a new model of collaboration. Meanwhile, existing projects in newborn health should be closely evaluated and replicated where appropriate. Innovative and cost-effective projects—such as the SEARCH project in India, the Warmi project in Bolivia, or the Bidan di Desa (Village Midwife) project in Indonesia—have shown such promising initial results that they should be tested, adapted, and evaluated further. Indeed, Save the Children's Saving Newborn Lives initiative is

**SAVE THE CHILDREN'S WARMI PROJECT**

**The objective of the Warmi Project is to improve maternal and newborn health in rural areas of Bolivia with limited access to modern medical facilities. During the demonstration phase (1990–1993), the program focused on initiating and strengthening women's organizations, developing women's skills in identifying problems, and training community members in safe birthing techniques. As a result of the intervention, perinatal mortality decreased from 117 deaths per 1,000 births before the intervention to 44 deaths per 1,000 births after. There was a significant increase in the number of women participating in women's organizations following the intervention, as well as in the number of functioning women's organizations. The proportion of women receiving prenatal care and initiating breastfeeding on the first day after birth also increased significantly. The study demonstrated that community organization can improve maternal and child health in remote areas.[49]** BOLIVIA

BEST COPY AVAILABLE

**A MODEL OF NEONATAL CARE IN THE GADCHIROLI DISTRICT IN INDIA**

In the Gadchiroli district of India, about 1,000 kilometers from the state capital, Mumbai, a remarkable model of home-based neonatal care has managed to significantly reduce neonatal and infant mortality among malnourished, illiterate, rural villagers in the SEARCH project area.

Recognizing that hospital-based care for sick newborns was not possible in their community, Drs Rani and Abhay Bang and colleagues at SEARCH (Society for Education, Action & Research in Community Health) conceived the innovative idea of a home-based newborn health care program. It had to be home-based, they concluded, because 83 percent of births in rural India occur at home; more than 90 percent of parents are unwilling to go to hospital for treatment of a sick newborn; local doctors are not trained to manage sick neonates; and hospital care is inaccessible and costly.

The SEARCH study collected baseline data for two years (1993–1995) from 39 intervention villages and 47 control villages. SEARCH then introduced neonatal care in the intervention villages (1995–1998) and monitored mortality rates in both the control and intervention villages.

The key promoters of neonatal health in this program are village health workers (VHWs) and TBAs. The VHWs visit each woman three times during her pregnancy, provide health education, and look after the neonate during the first month of life. They are trained to resuscitate asphyxiated babies, support breastfeeding and maintenance of body temperature, and to recognize and treat sepsis. They also provide hand-made portable incubators (a cloth bag insulated with foam) for LBW babies.

TBAs receive training and are supplied with clean delivery kits as well as iron, folic acid and calcium tablets, ointment for neonatal conjunctivitis, antiseptic ointment for cracked nipples, cotrimoxazole syrup for pneumonia, paracetamol tablets, vitamin A capsules for night blindness, and glycerin for mouth infections. They also provide condoms.

By the third year, 93 percent of newborns in the intervention areas were receiving home-based care. SEARCH was able to record 98 percent of births and child deaths in the area. While the NMR in the control area remained at around 50 to 65 per 1,000 over the course of the study, in the action area it dropped to 25 per 1,000 by the third year of intervention, a 62 percent reduction compared to the baseline period. The infant mortality rate was also nearly cut in half. About 75 percent of the reduction in NMR was attributed to fewer deaths with signs of infection. This package of care also significantly reduced the incidence of various neonatal morbidities as well as maternal morbidities, thus establishing the feasibility of combining postpartum care of the mother with neonatal care.

The package costs an estimated US$5.30 per newborn, and one death was avoided for every 18 babies who received care. The cost per life saved was an estimated US$95.40, which is less than the cost per life saved with measles vaccination. Abhay and Rani Bang hope that SEARCH will provide a creative initiative for similar organizations throughout the developing world.

Save the Children, through the Saving Newborn Lives initiative, is testing the impact of this approach in other settings, and is evaluating the sustainability of this strategy in a larger setting through the expansion of SEARCH's program to seven additional sites throughout Maharashtra state.[81] INDIA

already engaged in expanding the SEARCH project to seven different sites in India.

**Monitor and evaluate what we do.** Policymakers and program planners need good data in order to better understand how to use existing resources, monitor program performance, and make necessary changes in health care programs. It is critical to develop, validate, and use better process and outcome indicators to carefully monitor and document progress in newborn health and services. To this end, program managers and researchers will need to shift their focus from hospitals to the community, where most babies die.

**Enhance our knowledge base.** While information on the status of the newborn is increasingly available, less is known about how to prevent the causes of newborn death. Three types of research would be particularly helpful in addressing this need:

- **Formative research** to better understand current local beliefs and practices, and the reasons for these, so that effective behavior change strategies can be developed;
- **Operations research** to better understand how to deliver affordable, life-saving preventive and curative care; and
- **Epidemiological research** to pin-

BEST COPY AVAILABLE

point contributing factors to newborn deaths.

It is time to move from efficacy trials of single interventions to effectiveness trials with communities. Furthermore, interventions must be evaluated quickly so sustainable packages of care can be scaled up without delay, even in the most remote and impoverished areas. Finally, communications among researchers, program managers, and policymakers must be established at the outset of each research project to make sure study results are translated into effective programs.

**Keep the focus on the home and the community.** At the present time and for the foreseeable future in developing countries, the vast majority of births—and therefore of newborn deaths—will take place in the home. Accordingly, effective newborn care efforts must focus on this crucial setting and what transpires there.

Thus, programs must target birth attendants and other community health workers, whether it is to provide training, strengthen supervision and referral linkages, or provide supplies such as clean home delivery kits. Enhancing the capacity of these caregivers will help to ensure proper counseling of women and their families, a clean, well-managed delivery (or timely referral where necessary), and effective postnatal care for mother and child—the cornerstones of a successful newborn health program.

Programs must also target families with maternal and newborn health messages through non-health channels, such as community organizations and the media. The ultimate goal, of course, is changing behavior, of mothers and all family members, from practices which put mothers and newborns at risk to those which enhance their health and well-being.

## THE CHALLENGE AHEAD

The familiar call to "think globally and act locally" is as relevant to saving newborn lives as it is to other development efforts. The challenge is to transfer knowledge and funds from "high places" of learning and policy-making to the home and community. Donors and international agencies need to coordinate their activities and form partnerships to provide leadership at all levels and help lay the foundation of efforts to save newborns.

We have a great deal of knowledge about effective neonatal care and low-cost approaches such as tetanus toxoid immunization, skilled care at delivery, breastfeeding, and thermal control that can save many newborn lives. One challenge, therefore, is simply improving what we already do and applying what we already know. Another challenge is to identify cost-effective interventions to address newborn problems currently lacking ready solutions, such as managing asphyxia at the community level.

Saving newborn lives requires a paradigm shift. We need to change our focus to the time when most infants die—the first 28 days of life. We need to shift the focus of our research from hospitals to the community, where most babies die. We need to concentrate our efforts on those who are best placed to make the greatest contribution: family caregivers and those working at the community level. And we need to move quickly to ensure that proven, effective interventions are implemented on the widest possible scale.

Communities in developing countries will discover that ensuring a healthy beginning for every newborn will make a significant return on the investment, as each child has an opportunity to survive and thrive from the moment of birth.

**QUALITATIVE RESEARCH CAN PROVIDE VALUABLE INSIGHTS**

**MIRA (Mother and Infant Research Activities), a community-based project in the Makwanpur district of Nepal, spent nearly one year collecting ethnographic information during the first phase of the program. The facilitation team explored the issues around childbirth in the communities in which they were to initiate the intervention. This exploration served as a prolonged induction and training period for the facilitators, and generated a body of ethnographic information on pregnancy and childbirth. This included an understanding of how decisions are made within households, the role of mothers-in-law, pollution rituals, and spiritual beliefs about pregnancy-related problems. The group also discovered that most babies were being given cold baths within three hours of birth, exposing them to the risk of hypothermia. This understanding provides a starting point for the facilitators to discuss alternatives with community groups.[42] NEPAL**

## ENDNOTES


1 World Health Organization 2001 estimates. Based on data collected around 1999.

2 World Health Organization. Perinatal mortality: a listing of available information. FRH/MSM.96.7. Geneva: WHO, 1996.

3 World Health Organization 2001 estimates. Based on data collected around 1999.

4 Kramer, MS. Intrauterine growth and gestational duration determinants. *Pediatrics* 1987; 80(4):502–11.

5 United Nations Population Fund. The State of the World's Population 2000:Lives Together, Worlds Apart. New York: . UNFPA, 2001.

6 World Health Organization presentation. Neonatal survival intervention research workshop. Kathmandu, Nepal: WHO, April 29–May 3, 2001.

7 World Health Organization. Success stories in developing countries. Geneva: WHO, 2001. Available at: http://who.int/inf-new/mate3.thm

8 World Health Organization. Mother-baby package: implementing safe motherhood in countries. FHE/MSM/94.11. Geneva: WHO, 1994.

9 Bang AT, Bang RA, Baitule SB, Reddy MH, Deshmukh MD. Effect of home-based neonatal care and management of sepsis on neonatal mortality: field trial in rural India. *Lancet* 1999;354:1955–61.

10 Madame Adame Ba Konare. Speech at the regional forum on maternal and neonatal mortality reduction. Vision 2010. Bamako, Mali: UNICEF, May 2001.

11 World Health Organization 2001 estimates. Based on data collected around 1999.

12 World Health Organization 2001 estimates. Based on data collected around 1999.

13 Hyder AA, Morrow RH, Wali S, McGuckin J. Burden of disease for neonatal mortality in South Asia and Sub-Saharan Africa. Preliminary report submitted to Save the Children, USA. Baltimore, MD: Johns Hopkins University, 2001.

14 World Health Organization 2001 estimates. Based on data collected around 1999.

15 Barker DJ, Martyn CN, Osmond C, Hales CN, Fall CH. Growth in utero and serum cholesterol concentrations in adult life. *BMJ* 1993; 307:1524–1527.

16 Hales CN, Barker DJ, Clark PM et al. Foetal and infant growth and impaired glucose tolerance at age 64. *BMJ* 1991; 303:1018–1022.

17 Barker D. Intrauterine programming of coronary heart disease and stroke. *Acta Paediatr Suppl* 1997; 423:178–182.

18 Leon DA. Foetal growth and adult disease. *Eur J Clin Nutr* 1998; 52 (Suppl.1):S72–S82.

19 Grantham McGregor SM, Lira PI, Ashworth A, Morris SS, Assuncao AM. The development of low birth weight term infants and the effects of the environment in northeast Brazil. *J Pediatr* 1998; 132:661–6.

20 Lawn J, McCarthy BJ, Ross S. The Healthy Newborn: a reference manual for program managers. Atlanta, GA: CDC, CARE, CCHI, 2001. More information from www.cdc.gov/nccdphp/drh.

21 Lawn J, McCarthy BJ, Ross S. The Healthy Newborn: a reference manual for program managers. Atlanta, GA: CDC, CARE, CCHI, 2001. More information from www.cdc.gov/nccdphp/drh.

22 Zhu BP, Rolfes RT, Nangle BE, Horan JM. Effect of the interval between pregnancies on perinatal outcomes. *N Engl J Med* 1999; 340:589–94.

23 Caldwell JC, Reddy PH, Caldwell P. The causes of demographic change—experimental research in South India. 1989. ISBN 0299116107.

24 de Graft Johnson J. Save the Children, Malawi. Personal communication, June 2001.

25 Ministry of Health, India and Trends in childhood mortality in the developing world 1960–1996. New York: UNICEF, 1999. ISBN 92-806-3441-0.

26 Safe Motherhood Inter-Agency Group. *Skilled Care During Childbirth: A Review of the Evidence*. New York: Family Care International (in press). For more information, see RH at a Glance fact sheet at www.worldbank.org/hnp

27 Sejas, C. Save the Children, Bolivia. Personal communication, June 2001.

28 Stoll, B. The global impact of neonatal infection. *Clin Perinatol* 1997; 24 (1): 1–21.

29 UNICEF/WHO/UNFPA. Maternal and neonatal tetanus elimination by 2005. New York: UNICEF, 2000.

30 Victora CG, Smith PG, Vaughan JP, Nobre LC, Lombardi C, Teixeira AM, Fuchs SC, Moreira LB, Gigante LP, Barros R. Evidence for protection by breastfeeding against infant deaths from infectious diseases in Brazil. *Lancet* 1987; Aug, 8:319–321.

31 World Health Organization. World Health Report, 1998: Life in the 21st century—a vision for all. Geneva: WHO, 1998.

32. Kramer, MS. Intrauterine growth and gestational duration determinants. *Pediatrics* 1987; 80(4):502–11.

33. Yasmin S, Osrin D, Paul E, Costello AM de L. Neonatal mortality of low birth weight infants in Bangladesh. *Bull WHO* (in press).

34. Kramer, MS. Intrauterine growth and gestational duration determinants. *Pediatrics* 1987; 80(4):502–11.

35. Nielsen B, Liljestrand J, Hedegaard M, Thilsted S, Joseph A. Reproductive pattern, perinatal mortality, and sex preference in rural Tamil Nadu, South India: community based, cross sectional study. *BMJ* 1997; 314(7093):1521–4.

36. United Nations Population Fund. The State of the World's Population 2000:Lives Together, Worlds Apart. New York: UNFPA, 2001.

37. Save the Children. The State of the World's Mothers 2001. Available from http://www.savethechildren.org/mothers/learn/sowm2001/.htm

38. Murray C, Lopez A. Gender and nutrition in the global burden of disease, 1990–2020. In: Nutrition US-Co [ed.] Challenges for the 21st century: a gender perspective on nutrition through the life cycle. Geneva: ACC/SCN, 1998: 67–77.

39 Panter-Brick C. Women's work and maternal-child health: anthropological views on intervention. In: Costello AM de L, Manandhar DS, editors. Improving newborn infant health in developing countries. London: Imperial College Press 2000 distributed by World Scientific Publishing Co. P.O. Box 128, Farrer Road, Singapore, 912805.

40 Ceesay SM, Prentice AM, Cole TJ, Foord F, Weaver LT, Poskitt EM, Whitehead RG. Effects on birthweight and perinatal mortality of maternal dietary supplements in rural Gambia: five year randomised controlled trial. *BMJ* 1997; 315(7111):786–90.

41 Atukorala TM, de Silva LD, Dechering WH, Dassenaeike TS, Perera RS. Evaluation of effectiveness of iron-folate supplementation and antihelminthic therapy against anaemia in pregnancy–a study in the plantation sector of Sri Lanka. *Am J Clin Nutr* 1994; 60(2):286–92.

42 De Lon GR, Leslie PW, Wang SH, Jieng XM, Zhang ML, Rakeman M, Jiang JY, Ma T, Cao XY. Effect on infant mortality of iodination of irrigation water in severely iodine deficient area in China. *Lancet* 1997 Sep 13; 350 (9080):771–3.

43 Merialdi M, Caulfield LE, Zavaleta N, Figueroa A, DiPietro JA. Adding zinc to prenatal iron and folate tablets improves foetal neurobehavioural development. *Am J Obstet Gynecol* 1999 Feb; 180(2 Pt 1):483–90.

44 Osendarp SJM, van Raaij JMA, Darmstadt GL, Baqui AH, Hautvast GAJ, Fuchs GJ. Zinc supplementation during pregnancy and effects on growth and morbidity in low birthweight infants. *Lancet* 2001; 357:1080–85.

45 West KP Jr, Katz J, Khatry SK, LeClerq SC, Pradhan EK, Shrestha SR, Connor PB, Dali SM, Christian P, Pokhrel RP, Sommer A, the NNIPS-2 Study Group. Double-blind, cluster randomized trial of low dose supplementation with vitamin A or β-carotene on mortality related to pregnancy in Nepal. *BMJ* 1999; 318:570–575.

46 Christian P, West KP Jr, Katry SK, LeClerq SC, Kimbrough-Pradhan, Katz J, Shrestha SR. Maternal night blindness increases risk of mortality in the first 6 months of life among infants in Nepal. *J Nutr* 2001; 131:1510–1521.

47 Humphrey JH, Agoestina T, Wue L, et al. Impact of neonatal vitamin A supplementation on infant morbidity and mortality. *J Pediatr* 1999; 128:489–496.

48 Tielsch JM, Rahmathullah L, Thulasiraj RD, Katz J, Coles C. Impact of vitamin A supplementation to newborns on early infant mortality: a community-based, randomized trial in South India. Proc XX IVACG Meeting, Hanoi, Vietnam, 2001; p 70.

49 http://www.who.int/vaccines-diseases/services/immschedule.htm

50 Bellamy C. State of the World's Children. UNICEF 1999.

51 Stekatee, RW Wirima JJ, Slutsker WL, Khoromana CO, Reman JG, Heymann DL. Objectives and methodology in a study of malaria treatment and prevention in pregnancy in rural Malawi: the Mangochi Malaria Research Project. *Am J Trop Med Hyg* 1996;55(Suppl 1):8–16.

52 Shulman CE. Malaria in pregnancy: its relevance to safe-motherhood programmes. *Ann Trop Med Parasitol* 1999; 93(Suppl 1):S59–S66.

53 Coovadia HM and Rollins N. Current controversies in the prenatal transmission of HIV in developing countries. *Seminars in Neonatology* 1999; 4:192–200.

54 Vuthiponghe P, Bhadrakom C and Chaisilwattana P. Administration of zidovudine during late pregnancy and delivery to prevent perinatal HIV transmission–Thailand. *Morbidity and Mortality Weekly Report* 1998; 47:151–154.

55 World Health Organization. Making pregnancy safer. RHR00.6. Geneva: WHO, 2000.

56 MotherCare Policy brief #3. Washington DC: MotherCare, May 2000.

57 World Health Organization. Coverage of maternity care. A listing of available information. WHO/RHT/MSM/96.28. Geneva: WHO, 1996.

58 United Nations Population Fund. State of World Population 2000: Lives together, Worlds apart. New York: UNFPA, 2000.

59 Hofmeyer GJ, Nikodem VC, Wolman WL, Chalmers BE,


BEST COPY AVAILABLE

**ABBREVIATIONS**

**AIDS** Acquired Immunodeficiency Syndrome

**ANC** Antenatal care

**BCC** Behavior change communications

**BFHI** Baby-Friendly Hospital Initiative

**CDC** Centers for Disease Control and Prevention

**CEE** Central and Eastern Europe

**CHAPS** Community Health Partnerships, Malawi

**CIS** Commonwealth of Independent States

**DHS** Demographic and Health Surveys

**HDI** Human development index

**HIV** Human Immunodeficiency Virus

**IMCH** Integrated Maternal and Child Health

**IMR** Infant mortality rate

**IUGR** Intra-uterine growth retardation

**LBW** Low birth weight

**MIRA** Mother and Infant Research Activities, Nepal

**MMR** Maternal mortality rate

**MTCT** Mother-to-child transmission

**NGO** Nongovernmental organization

**NMR** Neonatal mortality rate

**OPV** Oral Polio Vaccine

**SEARCH** Society for Education, Action and Research in Community Health

**SNL** Saving Newborn Lives

**STI** Sexually transmitted infection

**TBA** Traditional birth attendant

**TFR** Total fertility rate

**TT** Tetanus toxoid

**UN** United Nations

**UNDP** United Nations Development Programme

**UNFPA** United Nations Population Fund

**UNICEF** United Nations International Children's Fund

**USAID** United States Agency for International Development

**VCT** Voluntary counseling and testing program

**VHW** Village health worker

**WHO** World Health Organization


Kramer TR. Companionship to modify the clinical birth environment: effect on progress and perceptions of labour and breastfeeding. *Br J Obs Gynae* 1991; 98:756–766.

60 World Health Organization. Thermal protection of the newborn: a practical guide. WHO/RHT/MSM/97.2. Geneva: WHO, 1997.

61 World Health Assembly. Resolution on infant and young child nutrition. Geneva: WHO, May 2001. Available from http://www.who.int/inf-pr-2001en/pr2001wha-6.html

62 Thaddeus S, Maine D. Too far to walk: maternal mortality in context. New York: Columbia University, 1990.

63 World Health Organization. World Health Report, 1998: Life in the 21st century—a vision for all. Geneva: WHO, 1998.

64 Palme-Kilander. Methods of resuscitation in low-Apgar score newborn infants—a national survey. *Acta Paediatr* 1992; 81:739–44.

65 Saugstad OS, Rootwelt T, Aalen O. Resuscitation of asphyxiated newborn infants with room air or oxygen; an international controlled trial; the Resair 2 Study. *Pediatrics* 1998; 102:1.

66 Bergman JJ, Jurisoo LA. The "kangaroo" method for treating low birth weight babies in a developing country. *Trop Doc* 1994; 24(2):57–60.

67 Academy for Educational Development LINKAGES Project. LINKAGES results. Presentation at USAID stakeholder meeting. Washington DC: AED, December 14, 2000.

68 Budin P. *The Nursling*. English translation by Maloney WJ. London: The Caxton Publishing Co, 1907.

69 World Health Organization Effect of breastfeeding on infant and child mortality due to infectious diseases in less developed countries: a pooled analysis. *Lancet* 2000;355 451–455.

70 Victora CG, Smith PG, Vaughan JP, Nobre LC, Lombardi C, Teixeira AM, Fuchs SC, Moreira LB, Gigante LP, Barros R. Evidence for protection by breastfeeding against infant deaths from infectious diseases in Brazil. *Lancet* 1987;2(8554): 319–321.

71 World Health Organization presentation. Neonatal survival intervention research workshop. Kathmandu, Nepal: WHO, April 29-May 3, 2001.

72 Morrow AL, Lourdes Guerrero M, Shults J, Calva JJ, Lutter C, Bravo J, Ruiz-Palacios G, Morrow RC, Butterfoss FD. Efficacy of home-based peer counselling to promote exclusive breastfeeding. *Lancet* 1999; 353:1226–1231.

73 Haider R, Ashworth A, Kabir K, Huttly SRA. Effect of community-based peer counsellors on exclusive breastfeeding practices in Dhakar, Bangladesh: a randomised controlled trial. *Lancet* 2000; 356(9242).

74 Academy for Educational Development LINKAGES Project. LINKAGES results. Presentation at USAID stakeholder meeting. Washington DC: AED, December 14, 2000.

75 http://www.who.int/vaccines-diseases/services/immschedule.htm

76 Academy for Educational Development LINKAGES Project. Breastfeeding and HIV/AIDS. FAQ sheet 1. Washington DC: AED, May 2001. http://www.linkagesproject.org

77 Coutsoudis A, Pillay P, Spooner E, Kuhn L, Coovadia HM. Influence of infant feeding patterns on early mother-to-child transmission of HIV-1 in Durban, South Africa: a prospective cohort study. *Lancet* 1999; 354:471–76.

78 Daly, P and Fadia S. Reproductive Health in Indonesia: Lessons from the Past and Opportunities for the Future. Washington DC: World Bank, 2000. Unpublished paper.

79 Indonesia Central Bureau of Statistics, State Ministry of Population/National Family Planning Coordinating Board, Ministry of Health and Macro International. Indonesia Demographic Health Survey. Calverton, MD: Central Bureau of Statistics and Macro International, 1997.

80 O'Rourke K, Howard-Grabman L, Seoane G. Impact of community organization of women on perinatal outcomes in rural Bolivia. *Rev Panam Salud Publica/Pan Am/Public Health* 1998; 3(1).

81 Bang AT, Bang RA, Baitule SB, Reddy MH, Deshmukh MD. Effect of home-based neonatal care and management of sepsis on neonatal mortality: field trial in rural India. *Lancet* 1999; 354:1955–61.

82 Manandhar, D. Mother and Infant Research Activities (MIRA). Nepal. Personal communication. June 2001.

83 Onis M de, Lossner M, Villar J. Levels and patterns of intrauterine growth retardation in developing countries. *Eur J Clin Nutr* 1998; 52:S5–S15.

84 Aarts C, Kylberg E, Hornell A, Hofvander Y, Grabe-Medhin M, Greiner T. How exclusive is breastfeeding? A comparison of data since birth with the current status data. *Int J Epi* 2000; 29:1041–1046.


BEST COPY AVAILABLE

# STATISTICAL OVERVIEW OF NEWBORN HEALTH

**This statistical overview reveals great variation in the health status of newborns around the world and in the services, practices and policies that affect their survival. Our hope is that these statistics, despite their limitations, will provide a tool to improve the health of tomorrow's newborns, and hence the future for all.**

## WHAT THE TABLES WILL AND WILL NOT TELL YOU

These tables provide information for 163 countries regarding 12 indicators relevant to newborn health and survival. The countries in these tables represent over 99 percent of the world's births. Most of the countries not included have less than 10,000 births per year.

Every attempt has been made to obtain the most recent and the best quality data available and, wherever possible, nationally reported data or population-based survey data have been used. But the information in these tables also comes from a wide variety of other sources, and the quality varies accordingly. In general, data quality is likely to be worse for countries that have suffered recent disruptions in infrastructure, due to war or natural disasters. Neonatal mortality data were especially difficult to access, and are likely to be underestimated, as discussed under the notes for this indicator. We have not adjusted the figures here despite expected inaccuracies, but have used data from national or international agencies and population-based surveys, and stated the likely sources of error and the limitations for each indicator. WHO has produced estimates for neonatal mortality, which are adjusted to allow for underestimation (Table 1, p.14). Partly because focus on newborn health is a recent phenomenon, information is lacking for many of the indicators that we would like to have included, especially late fetal deaths and postpartum/newborn care.

**Explanation of the tables**

The indicators are described in detail in the explanatory notes on page 45, which include a definition, justification for use, details of sources, and comments on the quality of the data. Data that were collected outside the time period specified in the column heading are marked with "x." If data were not available, the cell is marked "-."

Using a country's name in these tables does not imply recognition of any country or territory on the part of the compilers.

**Table I** Newborn Health Status includes the following indicators:

- Ranking by Human Development Index;
- Neonatal mortality rate;
- Estimated number of births annually;
- Calculated number of neonatal deaths annually;
- Percent of babies born with LBW;
- Estimated number of LBW babies per year; and
- Estimates of maternal death.

**Table II** Newborn Health Services and Practices includes the following indicators:

- Antenatal care contact;
- Tetanus toxoid immunization (2 vaccinations) coverage in pregnant women;
- Skilled attendant at delivery;
- Early breastfeeding; and
- Exclusive breastfeeding 0-4 months (based on 24 hour recall).



47

## TABLE I
## NEWBORN HEALTH STATUS

| Country | Human Development Index rank | Neonatal mortality rate per 1,000 live births 1995-2000 | Estimated births per year in thousands 1999 | Estimated number of neonatal deaths per year calculated | Percent of babies born with low birth weight 1995-99 | Estimated number of low birth weight babies per year |
|---|---|---|---|---|---|---|
| AFGHANISTAN | - | - | 1,139 | - | 20 | 27,800 |
| ALBANIA | 94 | - | 62 | - | 7 | 4,340 |
| ALGERIA | 107 | 22[x] | 881 | 19,382 | 9 | 79,290 |
| ANGOLA | 160 | - | 595 | - | 19 | 113,050 |
| ARGENTINA | 35 | 12 | 718 | 8,631 | 7 | 50,260 |
| ARMENIA | 93 | - | 46 | - | 9 | 4,140 |
| AUSTRALIA | 4 | 4 | 245 | 949 | 6 | 14,700 |
| AUSTRIA | 16 | 3 | 81 | 261 | 6 | 4,860 |
| AZERBAIJAN | 90 | - | 121 | - | 6 | 7,260 |
| BAHRAIN | 41 | - | 11 | - | 6 | 660 |
| BANGLADESH | 146 | 48 | 3,504 | 169,594 | 30 | 1,051,200 |
| BELARUS | 57 | - | 99 | - | - | - |
| BELGIUM | 7 | 4 | 105 | 420 | 6 | 6,300 |
| BENIN | 157 | 38 | 242 | 9,244 | 8 | 19,360 |
| BHUTAN | 142 | - | 76 | - | - | - |
| BOLIVIA | 114 | 34 | 264 | 8,923 | 5 | 13,200 |
| BOSNIA AND HERZEGOVINA | - | 9 | 39 | 351 | 3 | 1,170 |
| BOTSWANA | 122 | 22[x] | 53 | 1,192 | 11 | 5,830 |
| BRAZIL | 74 | 19 | 3,344 | 63,536 | 8 | 267,520 |
| BULGARIA | 60 | 8 | 71 | 537 | 6 | 4,260 |
| BURKINA FASO | 172 | 41 | 530 | 21,624 | 21 | 111,300 |
| BURUNDI | 170 | 35[x] | 273 | 9,610 | - | - |
| CAMBODIA | 136 | 45[a] | 360 | 16,200 | 18 | 64,800 |
| CAMEROON | 134 | 37 | 573 | 21,201 | 13 | 74,490 |
| CANADA | 1 | 4 | 343 | 1,357 | 6 | 20,580 |
| CAPE VERDE | 105 | - | 13 | - | 9 | 1,170 |
| CENTRAL AFRICAN REPUBLIC | 166 | 42 | 132 | 5,557 | 15 | 19,800 |
| CHAD | 167 | 44 | 323 | 14,179 | - | - |
| CHILE | 38 | 5[a] | 290 | 1,450 | 5 | 14,500 |
| CHINA | 99 | 23[x] | 19,821 | 455,883 | 6 | 1,189,260 |
| COLOMBIA | 68 | 19 | 988 | 18,475 | 9 | 89,820 |
| COMOROS | 137 | 38 | 24 | 917 | 8 | 1,920 |
| CONGO | 139 | - | 123 | - | 16 | 19,680 |
| CONGO, DEM. REP. | 152 | - | 2,293 | - | 15 | 343,950 |
| COSTA RICA | 48 | 8 | 90 | 684 | 7 | 6,300 |
| CÔTE D'IVOIRE | 154 | 42 | 540 | 22,680 | 12 | 64,800 |
| CROATIA | 49 | 7 | 47 | 321 | 5 | 2,350 |
| CUBA | 56 | 5 | 141 | 706 | 7 | 9,870 |
| CZECH REPUBLIC | 34 | 3 | 88 | 289 | 6 | 5,280 |
| DENMARK | 15 | 4 | 63 | 264 | 6 | 3,780 |
| DJIBOUTI | 149 | - | 23 | - | 11 | 2,530 |
| DOMINICAN REPUBLIC | 87 | 27 | 195 | 5,187 | 13 | 25,350 |
| ECUADOR | 91 | 19 | 309 | 5,871 | 13 | 40,170 |
| EGYPT | 119 | 30 | 1,720 | 52,288 | 10 | 172,000 |
| EL SALVADOR | 104 | 23 | 167 | 3,841 | 13 | 21,710 |
| EQUATORIAL GUINEA | 131 | - | 18 | - | - | - |
| ERITREA | 159 | 25 | 148 | 3,700 | 13 | 19,240 |
| ESTONIA | 46 | 6 | 12 | 68 | | |
| ETHIOPIA | 171 | 49 | 2,699 | 131,441 | 16 | 431,840 |
| FIJI | 66 | - | 17 | - | 12 | 2,040 |
| FINLAND | 11 | 3 | 57 | 171 | 4 | 2,280 |
| FRANCE | 12 | 3 | 711 | 2,214 | 5 | 35,550 |
| GABON | 123 | - | 44 | - | 8 | 3,520 |
| GAMBIA | 161 | 40[b] | 50 | 2,000 | 14 | 7,000 |
| GEORGIA | 70 | 23 | 69 | 1,580 | 5 | 3,450 |

### KEY

x Indicates that the data were collected outside the time period specified in the column heading.

- Indicates that the data were not available.

a WHO estimates made in 2001 based on the best available data.

b Ceesay SM et al. *BMJ* 1997; 315: 786-790.

c Ibrahim MM et al. Bull WHO, 1996; 74(5): 547-552.

d R Pattinson. Unpublished data based on 27 hospital-based sentinel sites during 2000.

| Estimated number of maternal deaths per 100,000 live births 1995 | Country | Human Development Index rank | Neonatal mortality rate per 1,000 live births 1995-2000 | Estimated births per year in thousands 1999 | Estimated number of neonatal deaths per year calculated | Percent of babies born with low birth weight 1995-99 | Estimated number of low birth weight babies per year | Estimated number of maternal deaths per 100,000 live births 1995 |
|---|---|---|---|---|---|---|---|---|
| 819 | GERMANY | 14 | 3 | 736 | 2,350 | 5 | 36,800 | 12 |
| 31 | GHANA | 129 | 30 | 724 | 21,502 | 8 | 57,920 | 586 |
| 148 | GREECE | 25 | 5 | 97 | 503 | 6 | 5,820 | 2 |
| 1,308 | GUATEMALA | 120 | 23 | 399 | 9,296 | 15 | 59,850 | 267 |
| 84 | GUINEA | 162 | 48 | 312 | 15,100 | 13 | 40,560 | 1,224 |
| 29 | GUINEA BISSAU | 169 | - | 49 | - | 20 | 9,800 | 914 |
| 6 | GUYANA | 96 | - | 18 | - | 15 | 2,700 | 151 |
| 11 | HAITI | 150 | 31 | 255 | 7,956 | 15 | 38,250 | 1,122 |
| 37 | HONDURAS | 113 | 20 | 205 | 4,100 | 9 | 18,450 | 221 |
| 38 | HUNGARY | 43 | 6 | 96 | 613 | 9 | 8,640 | 23 |
| 596 | ICELAND | 5 | 5 | 4 | 19 | 4 | 160 | - |
| 33 | INDIA | 128 | 43 | 24,489 | 1,053,027 | 33 | 8,081,370 | 437 |
| 8 | INDONESIA | 109 | 22 | 4,608 | 100,454 | 8 | 368,640 | 472 |
| 884 | IRAN, ISLAMIC REP. OF | 97 | 30[a] | 1,392 | 41,760 | 10 | 139,200 | 130 |
| 502 | IRAQ | 126 | 30[a] | 804 | 24,120 | 15 | 120,600 | 367 |
| 550 | IRELAND | 18 | 4 | 53 | 209 | 6 | 2,120 | 9 |
| 15 | ISRAEL | 23 | 4 | 118 | 493 | 7 | 1,260 | 8 |
| 1,379 | ITALY | 19 | 5 | 506 | 2,410 | 5 | 25,300 | 11 |
| 262 | JAMAICA | 83 | 8 | 54 | 432 | 11 | 5,940 | 115 |
| 23 | JAPAN | 9 | 2 | 1,271 | 2,307 | 7 | 88,970 | 12 |
| 1,379 | JORDAN | 92 | 19 | 223 | 4,237 | 10 | 26,280 | 61 |
| 1,881 | KAZAKHSTAN | 73 | 20 | 292 | 5,694 | 9 | 158,720 | 78 |
| 590 | KENYA | 138 | 28 | 992 | 28,173 | 16 | 158,720 | 1,339 |
| 720 | KOREA, DEM. PEOPLE'S REP. | - | - | 472 | - | 4 | 18,880 | 35 |
| 6 | KOREA REP. | 31 | 5[a] | 681 | 3,405 | 9 | 61,290 | 20 |
| 188 | KUWAIT | 36 | - | 40 | - | 7 | 2,800 | 25 |
| 1,205 | KYRGYZSTAN | 98 | 32 | 116 | 3,666 | 6 | 6,960 | 79 |
| 1,497 | LAO PEOPLE' DEM. REP. | 140 | - | 205 | - | 18 | 36,900 | 653 |
| 33 | LATVIA | 63 | 8 | 20 | 160 | - | - | 68 |
| 62 | LEBANON | 82 | - | 73 | - | 10 | 7,300 | 127 |
| 119 | LESOTHO | 127 | - | 73 | - | 11 | 8,030 | 529 |
| 573 | LIBERIA | - | 68[x] | 129 | 8,760 | - | - | 1,016 |
| 1,108 | LIBYAN ARAB JAMAHIRIYA | 72 | - | 160 | - | 7 | 11,200 | 117 |
| 939 | LITHUANIA | 52 | 6 | 36 | 225 | 4 | 1,440 | 27 |
| 35 | LUXEMBOURG | 17 | 2 | 5 | 11 | 6 | 300 | 0 |
| 1,188 | MACEDONIA, TFYR | 69 | 10 | 31 | 322 | - | - | 17 |
| 18 | MADAGASCAR | 141 | 40 | 604 | 24,402 | 5 | 30,200 | 583 |
| 24 | MALAWI | 163 | 41[x] | 497 | 20,476 | 20 | 99,400 | 576 |
| 14 | MALAYSIA | 61 | 12 | 520 | 6,344 | 9 | 46,800 | 39 |
| 15 | MALDIVES | 89 | - | 10 | - | 13 | 1,300 | 385 |
| 520 | MALI | 165 | 60 | 507 | 30,623 | 16 | 81,120 | 630 |
| 110 | MALTA | 27 | 5 | 5 | 24 | 4 | 200 | 0 |
| 207 | MAURITANIA | 147 | 41[x] | 104 | 4,264 | 11 | 11,440 | 874 |
| 174 | MAURITIUS | 71 | 17 | 18 | 314 | 13 | 2,320 | 45 |
| 183 | MEXICO | 55 | 25 | 2,324 | 58,100 | 7 | 162,680 | 67 |
| 1,404 | MOLDOVA, REP. | 102 | 9 | 56 | 527 | 5 | 2,240 | 63 |
| 1,131 | MONGOLIA | 117 | - | 58 | - | 7 | 4,060 | 63 |
| 78 | MOROCCO | 124 | 20 | 703 | 14,060 | 9 | 63,270 | 390 |
| 1,841 | MOZAMBIQUE | 168 | 54 | 826 | 44,521 | 12 | 99,120 | 975 |
| 20 | MYANMAR | 125 | - | 942 | - | 24 | 226,080 | 165 |
| 6 | NAMIBIA | 115 | 32 | 60 | 1,890 | 16 | 9,600 | 368 |
| 20 | NEPAL | 144 | 50 | 82 | 4,092 | 27 | 22,140 | 826 |
| 617 | NETHERLANDS | 8 | 3 | 176 | 528 | 5 | 8,800 | 10 |
| 1,071 | NEW ZEALAND | 20 | 6 | 57 | 223 | 6 | 3,420 | 15 |
| 22 | NICARAGUA | 116 | 17 | 174 | 2,976 | 9 | 15,660 | 246 |

| Country | Human Development Index rank | Neonatal mortality rate per 1,000 live births 1995-2000 | Estimated births per year in thousands 1999 | Estimated number of neonatal deaths per year calculated | Percent of babies born with low birth weight 1995-99 | Estimated number of low birth weight babies per year | Estimated number of maternal deaths per 100,000 live births 1995 |
|---|---|---|---|---|---|---|---|
| NIGER | 173 | 44 | 497 | 21,967 | 15 | 74,550 | 923 |
| NIGERIA | 151 | 37 | 4,176 | 154,512 | 16 | 668,160 | 1,129 |
| NORWAY | 2 | 3 | 57 | 164 | 4 | 2,280 | 9 |
| OMAN | 86 | - | 87 | - | 8 | 6,960 | 115 |
| PAKISTAN | 135 | 49[x] | 5,349 | 261,566 | 25 | 1,337,250 | 201 |
| PANAMA | 59 | - | 61 | - | 10 | 6,100 | 98 |
| PAPUA NEW GUINEA | 133 | - | 149 | - | 23 | 34,270 | 387 |
| PARAGUAY | 81 | 20 | 165 | 3,300 | 5 | 8,250 | 172 |
| PERU | 80 | 24 | 610 | 14,640 | 11 | 67,100 | 235 |
| PHILIPPINES | 77 | 18 | 2,064 | 36,739 | 9 | 185,760 | 238 |
| POLAND | 44 | 9 | 417 | 3,808 | 8.6 | 35,862 | 12 |
| PORTUGAL | 28 | 4 | 102 | 421 | 5 | 5,100 | 12 |
| QATAR | 42 | - | 11 | - | 5 | 550 | 41 |
| ROMANIA | 64 | 18 | 201 | 3,698 | 7 | 14,070 | 62 |
| RUSSIAN FEDERATION | 62 | 9 | 1,434 | 1,233 | 7 | 100,380 | 74 |
| RWANDA | 164 | 39[x] | 295 | 11,387 | - | - | 2,318 |
| SAUDI ARABIA | 75 | 10[a] | 696 | 6,960 | 7 | 48,720 | 23 |
| SENEGAL | 155 | 37 | 364 | 13,614 | 4 | 14,560 | 1,198 |
| SIERRA LEONE | 174 | - | 214 | - | 11 | 23,540 | 2,065 |
| SINGAPORE | 24 | 26 | 49 | 105 | 7 | 3,430 | 9 |
| SLOVAKIA | 40 | - | 56 | - | - | - | 14 |
| SLOVENIA | 29 | 4 | 18 | 69 | 6 | 1,080 | 17 |
| SOLOMON ISLANDS | 121 | - | 15 | - | 20 | 3,000 | 59 |
| SOMALIA | - | 48[c] | 500 | 24,000 | 16 | 80,000 | 1,582 |
| SOUTH AFRICA | 103 | 11[d] | 1,055 | 116,050 | 14[d] | 147,700 | 341 |
| SPAIN | 21 | 4 | 358 | 1,285 | 4 | 14,320 | 8 |
| SRI LANKA | 84 | 20 | 328 | 6,560 | 25 | 82,000 | 62 |
| SUDAN | 143 | 44[x] | 944 | 41,347 | 15 | 141,600 | 1,452 |
| SWAZILAND | 112 | - | 37 | - | 10 | 3,700 | 374 |
| SWEDEN | 6 | 3 | 86 | 227 | 5 | 4,300 | 8 |
| SWITZERLAND | 13 | 3 | 79 | 237 | 5 | 3,950 | 8 |
| SYRIAN ARAB REPUBLIC | 111 | 18 | 472 | 8,496 | 7 | 33,040 | 195 |
| TAJIKISTAN | 110 | - | 189 | - | 6 | 12,285 | 123 |
| TANZANIA, REP | 156 | 40 | 1,332 | 53,280 | 14 | 186,480 | 1,059 |
| THAILAND | 76 | 20 | 997 | 20,139 | 6 | 59,820 | 44 |
| TOGO | 145 | 41 | 185 | 7,640 | 20 | 37,000 | 983 |
| TRINIDAD AND TOBAGO | 50 | 10 | 18 | 180 | 10 | 1,800 | 67 |
| TUNISIA | 101 | 30 | 190 | 5,700 | 8 | 15,200 | 69 |
| TURKEY | 85 | 26 | 1,415 | 36,507 | 8 | 113,200 | 56 |
| TURKMENISTAN | 100 | - | 121 | - | 5 | 6,050 | 63 |
| UGANDA | 158 | 27 | 1,081 | 29,187 | 13 | 140,530 | 1,056 |
| UKRAINE | 78 | 10 | 482 | 4,627 | 5 | 24,100 | 45 |
| UNITED ARAB EMIRATES | 45 | - | 44 | - | 6 | 2,640 | 30 |
| UNITED KINGDOM | 10 | 4 | 680 | 2,808 | 7 | 47,600 | 10 |
| UNITED STATES | 3 | 5 | 3,754 | 18,524 | 7 | 262,780 | 12 |
| URUGUAY | 39 | - | 58 | - | 8 | 4,640 | 51 |
| UZBEKISTAN | 106 | 23 | 653 | 14,888 | 6 | 39,130 | 59 |
| VENEZUELA | 65 | 10[a] | 574 | 5,740 | 9 | 51,660 | 43 |
| VIET NAM | 108 | 18 | 1,654 | 30,434 | 17 | 281,180 | 96 |
| YEMEN | 148 | 34 | 821 | 27,586 | 19 | 155,990 | 850 |
| YUGOSLAVIA | - | 15[a] | 136 | 2,040 | 6 | 8,160 | 15 |
| ZAMBIA | 153 | 36 | 377 | 13,346 | 13 | 49,010 | 867 |
| ZIMBABWE | 130 | 29 | 354 | 10,266 | 10 | 35,400 | 609 |

## TABLE II
## NEWBORN HEALTH SERVICES

| Country | Human Development Index rank | Percent of pregnant women with at least one antenatal visit 1995-99 | Percent of pregnant women with at least two tetanus toxoid immunizations 1997-99 | Percent of births attended by skilled personnel 1995-2000 | Percent of babies breastfed in the first hour of life 1995-99 |
|---|---|---|---|---|---|
| AFGHANISTAN | | 8 | 19 | 8 | - |
| ALBANIA | 94 | 58 | 77 | 99 | - |
| ALGERIA | 107 | - | 52 | 77 | 22 |
| ANGOLA | 160 | 52 | 16 | 17 | - |
| ARGENTINA | 35 | 95 | - | 98 | - |
| ARMENIA | 93 | 82 | 36 | 97 | - |
| AUSTRALIA | 4 | 100 | - | 100 | - |
| AUSTRIA | 16 | 100 | - | 100 | - |
| AZERBAIJAN | 90 | 98 | - | 100 | - |
| BAHRAIN | 41 | 96 | 80 | 98 | 40 |
| BANGLADESH | 146 | 33 | 85 | 13 | 13 |
| BELARUS | 57 | - | - | 100 | - |
| BELGIUM | 7 | - | - | 100 | - |
| BENIN | 157 | 80 | 90 | 60 | 24 |
| BHUTAN | 142 | 51 | 73 | 15 | - |
| BOLIVIA | 114 | 69 | 27 | 59 | 39 |
| BOSNIA AND HERZEGOVINA | | 99 | - | 97 | - |
| BOTSWANA | 122 | 92 | 56 | 87 | - |
| BRAZIL | 74 | 82 | 30 | 92 | 32 |
| BULGARIA | 60 | - | - | 100 | - |
| BURKINA FASO | 172 | 61 | 30 | 27 | 30 |
| BURUNDI | 170 | 88 | 9 | 24 | - |
| CAMBODIA | 136 | 34 | 33 | 34 | - |
| CAMEROON | 134 | 78 | 44 | 55 | 38 |
| CANADA | 1 | 100 | - | 100 | - |
| CAPE VERDE | 105 | 99 | 52 | 54 | |
| CENTRAL AFRICAN REP | 166 | 67 | 25 | 46 | 34 |
| CHAD | 167 | 23 | 27 | 15 | 24 |
| CHILE | 38 | 98 | - | 100 | - |
| CHINA | 99 | 79 | 13 | 67 | - |
| COLOMBIA | 68 | 91 | 57 | 85 | 49 |
| COMOROS | 137 | 84 | 22 | 52 | 25 |
| CONGO | 139 | 55 | 33 | 50 | - |
| CONGO, DEM REP. | 152 | 66 | - | | - |
| COSTA RICA | 48 | 95 | - | 98 | - |
| CÔTE D'IVOIRE | 154 | 83 | 44 | 47 | 44 |
| CROATIA | 49 | - | - | 100 | - |
| CUBA | 56 | 100 | 70 | 100 | - |
| CZECH REPUBLIC | 34 | 100 | - | 99 | - |
| DENMARK | 15 | 100 | - | 100 | - |
| DJIBOUTI | 149 | 76 | 14 | 79 | - |
| DOMINICAN REP | 87 | 98 | 86 | 99 | 63 |
| ECUADOR | 91 | 75 | 34 | 71 | 38 |
| EGYPT | 119 | 53 | 66 | 61 | 41 |
| EL SALVADOR | 104 | 69 | 70 | 90 | 15 |
| EQUATORIAL GUINEA | 131 | 37 | - | 5 | - |
| ERITREA | 159 | 49 | 28 | 21 | 48 |
| ESTONIA | 46 | 98 | - | 95 | - |
| ETHIOPIA | 171 | 26 | 35 | 10 | - |
| FIJI | 66 | 100 | - | - | - |
| FINLAND | 11 | 100 | - | 100 | 77 |
| FRANCE | 12 | 99 | 83 | 99 | - |
| GABON | 123 | 86 | 25 | 80 | - |
| GAMBIA | 161 | 86 | 96 | 44 | - |
| GEORGIA | 79 | 95 | - | 96 | - |

### KEY

- Indicates that the data were not available.

◆ The US data regarding exclusive breastfeeding are based on babies exclusively breastfed from birth using NSFG survey data.

| Percent of babies aged 0-4 months exclusively breastfed (24 hour recall) 1995-99 | Country | Human Development Index rank | Percent of pregnant women with at least one antenatal visit 1995-99 | Percent of pregnant women with at least two tetanus toxoid immunizations 1997-99 | Percent of births attended by skilled personnel 1995-2000 | Percent of babies breastfed in the first hour of life 1995-99 | Percent of babies aged 0-4 months exclusively breastfed (24 hour recall) 1995-99 |
|---|---|---|---|---|---|---|---|
| 25 | GERMANY | 14 | 99 | 80 | 100 | - | 33 |
| 9 | GHANA | 129 | 88 | 52 | 44 | 16 | 36 |
| 48 | GREECE | 25 | - | - | 99 | - | - |
| 12 | GUATEMALA | 120 | 53 | 38 | 41 | 55 | 47 |
| - | GUINEA | 162 | 71 | 48 | 35 | - | 13 |
| 21 | GUINEA BISSAU | 169 | 62 | 13 | 35 | - | 42 |
| - | GUYANA | 96 | 95 | 82 | 95 | - | - |
| - | HAITI | 150 | 79 | 38 | 21 | 36 | 3 |
| 26 | HONDURAS | 113 | 84 | 100 | 55 | 43 | 42 |
| 36 | HUNGARY | 43 | - | - | 99 | - | - |
| 53 | ICELAND | 5 | 100 | - | 100 | - | 50 |
| - | INDIA | 128 | 60 | 73 | 34 | 16 | 37 |
| - | INDONESIA | 109 | 90 | 81 | 56 | 8 | 52 |
| 15 | IRAN, ISLAMIC REP. | 97 | 77 | 48 | 86 | - | 66 |
| - | IRAQ | 126 | 78 | 51 | 54 | - | - |
| 61 | IRELAND | 18 | - | - | 100 | - | |
| 8 | ISRAEL | 23 | 90 | - | 99 | - | - |
| 39 | ITALY | 19 | 99 | - | 100 | - | - |
| 42 | JAMAICA | 83 | 99 | 52 | 95 | - | - |
| - | JAPAN | 9 | - | - | 100 | - | - |
| 5 | JORDAN | 92 | 91 | 18 | 97 | 32 | 15 |
| 89 | KAZAKHSTAN | 73 | 92 | - | 98 | 10 | 59 |
| 16 | KENYA | 138 | 92 | 44 | 44 | 58 | 17 |
| 16 | KOREA, DEM. PEOPLE'S REP. | | 100 | 5 | 100 | - | 97 |
| - | KOREA, REP. OF | 31 | 96 | 71 | 98 | - | - |
| 57 | KUWAIT | 36 | 95 | 70 | 98 | - | - |
| 23 | KYRGYZSTAN | 98 | 97 | | 98 | 53 | 31 |
| 2 | LAO PEOPLE DEM. REP. | 140 | 25 | 36 | 14 | - | 39 |
| 74 | LATVIA | 63 | - | - | 100 | - | - |
| 64 | LEBANON | 82 | 87 | | 89 | 15 | 41 |
| 16 | LESOTHO | 127 | 89 | - | 50 | - | 54 |
| 5 | LIBERIA | | 83 | 14 | 58 | - | - |
| 43 | LIBYAN ARAB JAMAHIRIYA | 72 | 81 | - | 94 | 22 | - |
| 32 | LITHUANIA | 52 | - | - | 95 | - | - |
| 35 | LUXEMBOURG | 17 | 99 | - | 100 | - | - |
| 4 | MACEDONIA, TFYR | 69 | 100 | - | 97 | | 45 |
| 24 | MADAGASCAR | 141 | 58 | 35 | 47 | 34 | 61 |
| 76 | MALAWI | 163 | 90 | 97 | 55 | 59 | 11 |
| - | MALAYSIA | 61 | 90 | 81 | 96 | - | - |
| - | MALDIVES | 89 | 95 | 95 | 90 | - | 8 |
| - | MALI | 165 | 46 | 62 | 24 | 10 | 13 |
| 25 | MALTA | 27 | - | - | 98 | - | - |
| 29 | MAURITANIA | 147 | 49 | 13 | 40 | 5 | 60 |
| 60 | MAURITIUS | 71 | 99 | 75 | 97 | 20 | 16 |
| 21 | MEXICO | 55 | 86 | 67 | 86 | - | 38 |
| - | MOLDOVA, REP. | 102 | 99 | - | - | 8 | - |
| 66 | MONGOLIA | 117 | 89 | - | 93 | - | 64 |
| - | MOROCCO | 124 | 45 | 36 | 40 | 43 | 31 |
| 84 | MOZAMBIQUE | 168 | 70 | 53 | 44 | 81 | 38 |
| - | MYANMAR | 125 | 80 | 64 | 56 | - | - |
| 26 | NAMIBIA | 115 | 88 | 81 | 68 | 55 | 22 |
| - | NEPAL | 144 | 25 | 65 | 9 | 18 | 83 |
| 32 | NETHERLANDS | 8 | 95 | 80 | 100 | - | - |
| 35 | NEW ZEALAND | 20 | 95 | - | 95 | - | - |
| 18 | NICARAGUA | 116 | 82 | 100 | 65 | 80 | 29 |

| Country | Human Development Index rank | Percent of pregnant women with at least one antenatal visit 1995-99 | Percent of pregnant women with *at least two* tetanus toxoid immunizations 1997-99 | Percent of births *attended by* skilled personnel 1995-2000 | Percent of babies *breastfed* in the first hour of life 1995-99 | Percent of babies aged 0-4 months exclusively breastfed (24 hour recall) 1995-99 |
|---|---|---|---|---|---|---|
| NIGER | 173 | 38 | 19 | 18 | 28 | 1 |
| NIGERIA | 151 | 60 | 29 | 33 | 33 | 22 |
| NORWAY | 2 | - | - | 100 | 71 | - |
| OMAN | 86 | 98 | 97 | 91 | 83 | 31 |
| PAKISTAN | 135 | 27 | 51 | 19 | 9 | 16 |
| PANAMA | 59 | 72 | - | 90 | - | 32 |
| PAPUA NEW GUINEA | 133 | 78 | 14 | 53 | - | 75 |
| PARAGUAY | 81 | 89 | 32 | 71 | 30 | 7 |
| PERU | 80 | 67 | 57 | 56 | 44 | 63 |
| PHILIPPINES | 77 | 86 | 38 | 56 | 42 | 47 |
| POLAND | 44 | 98 | - | 99 | 65 | 60 |
| PORTUGAL | 28 | 99 | - | 98 | - | 41 |
| QATAR | 42 | 100 | - | 98 | - | - |
| ROMANIA | 64 | - | - | 99 | - | - |
| RUSSIAN FED | 62 | - | - | 99 | - | - |
| RWANDA | 164 | 94 | 83 | 26 | 20 | 61 |
| SAUDI ARABIA | 75 | 90 | 66 | 91 | | 31 |
| SENEGAL | 155 | 82 | 45 | 47 | 16 | 16 |
| SIERRA LEONE | 174 | 68 | 25 | 42 | - | 2 |
| SINGAPORE | 24 | 100 | - | 100 | - | - |
| SLOVAKIA | 40 | - | - | 95 | - | - |
| SLOVENIA | 29 | 98 | - | 100 | - | - |
| SOLOMON ISLANDS | 121 | 71 | 55 | 85 | - | - |
| SOMALIA | | 40 | 16 | 2 | - | 1 |
| SOUTH AFRICA | 103 | 94 | 26 | 84 | - | 10 |
| SPAIN | 21 | - | - | 96 | - | - |
| SRI LANKA | 84 | 80 | 91 | 94 | - | 24 |
| SUDAN | 143 | 54 | 62 | 86 | 60 | 14 |
| SWAZILAND | 112 | 70 | 96 | 56 | - | 37 |
| SWEDEN | 6 | 100 | - | 100 | - | - |
| SWITZERLAND | 13 | 99 | | 99 | 67 | 48 |
| SYRIAN ARAB REPUBLIC | 111 | 33 | 94 | 76 | 22 | - |
| TAJIKISTAN | 110 | 71 | - | 71 | - | 19 |
| TANZANIA, U. REP. OF | 156 | 82 | 77 | 35 | 59 | 41 |
| THAILAND | 76 | 86 | 90 | 71 | - | 4 |
| TOGO | 145 | 82 | 48 | 51 | 19 | 15 |
| TRINIDAD & TOBAGO | 50 | 98 | - | 98 | - | 10 |
| TUNISIA | 101 | 79 | 80 | 81 | 38 | 12 |
| TURKEY | 85 | 68 | 36 | 81 | 21 | 9 |
| TURKMENISTAN | 100 | 90 | - | 96 | - | 54 |
| UGANDA | 158 | 91 | 49 | 38 | 49 | 7 |
| UKRAINE | 78 | 100 | - | 100 | - | 82 |
| UNITED ARAB EMIRATES | 45 | 97 | - | 99 | 25 | - |
| UNITED KINGDOM | 10 | 99 | - | 98 | 46 | <16 |
| UNITED STATES | 3 | 99 | - | 99 | - | 19 + |
| URUGUAY | 39 | 94 | - | 100 | - | - |
| UZBEKISTAN | 106 | 97 | - | 96 | 19 | 22 |
| VENEZUELA | 65 | 76 | 88 | 95 | - | 7 |
| VIET NAM | 108 | 71 | 85 | 77 | - | 29 |
| YEMEN | 148 | 33 | 26 | 22 | 47 | 25 |
| YUGOSLAVIA | | - | - | 93 | - | 11 |
| ZAMBIA | 153 | 96 | 55 | 47 | 58 | 11 |
| ZIMBABWE | 130 | 93 | 58 | 84 | 40 | 16 |

## TABLE I NEWBORN HEALTH STATUS

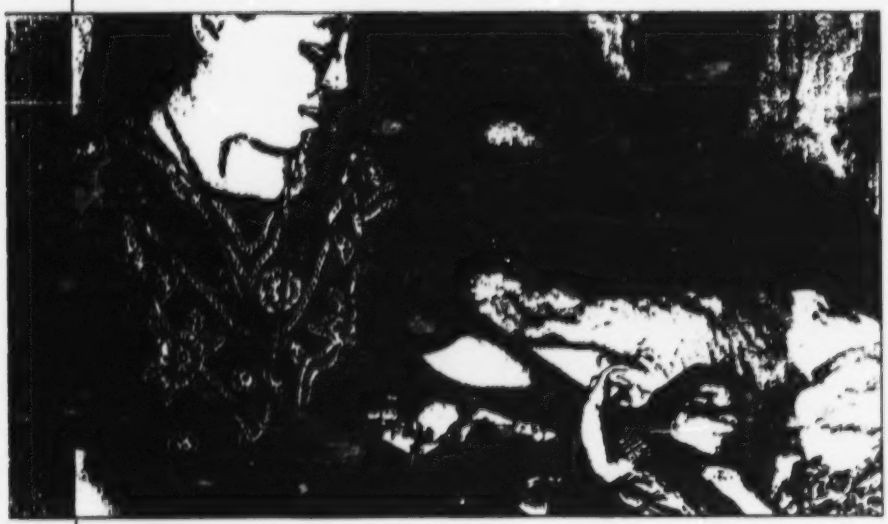
**Human Development Index rank**
**Definition** A composite indicator of development status developed by UNDP, including: Life expectancy at birth; Educational achievement (composed of adult literacy and combined gross primary, secondary and tertiary enrollment); and Real GDP per capita.
**Justification for inclusion** This is a broad, well-recognized indicator of development status. Some countries have a low rank for HDI, and yet have relatively low NMR, such as Cuba.
**Sources** From The World Development report 1999, UNDP, for 176 countries. Available on the web at www.undp.org/hdro/index.html
**Data quality and limitations of the indicator** This composite index involves six indicators, and the quality of data varies by country and by indicator, which may affect ranking.

**Neonatal mortality rate**
**Definition** The neonatal mortality rate is the number of liveborn babies who die in the first 28 days after birth, per 1,000 live births.
**Justification for inclusion** Neonatal mortality rate (NMR) is the key newborn survival indicator. Deaths of babies in late pregnancy (fetal deaths or stillbirths) are closely related to early neonatal deaths as the causes are similar. Very limited information is available about the numbers of fetal deaths. The lack of useable data on late fetal deaths also means that we cannot report perinatal mortality, which is the sum of late fetal and early neonatal (first week of life) deaths. The number of neonatal deaths per country was calculated using the estimated births per country from United Nations Population Division 1999.
**Sources** Obtained from a number of sources including: Demographic and Health Surveys (DHS) and the Centers for Disease Control and Prevention (CDC); nationally reported data from countries with vital registration coverage over 90 percent; a few population-based research trials (references footnoted); WHO estimates for eight countries, using the best available data.
**Data quality and limitations of the indicator** The statistics included for NMR are likely to be underestimates, especially in countries with limited national reporting systems. Even in industrialized countries, neonatal deaths may be underreported, especially among babies who are very small or die very soon after birth. The data used here are based on national reporting or on population-based surveys such as DHS. The nationally reported data are mainly from industrialized countries, where data quality is determined by the efficiency of the reporting system. Different countries may have different definitions of livebirths and neonatal deaths; for example, some countries do not include a baby dying in the first 24 hours as a livebirth, which may reduce the neonatal mortality rate by as much as 40 percent. The survey data is collected by asking mothers to report neonatal death, and so may underestimate reality as women may not give this information to the interviewer. Global estimates of neonatal (and fetal and perinatal) mortality are generated by the WHO using mortality rates that are adjusted for estimated under-reporting of fetal and neonatal deaths. The first global estimates were produced in 1996, and the 2001 estimates (based on data collected circa 1999) are shown in Table 1, p.14.

**Estimated births per year**
The expected number of births per year for each country, estimated by United Nations Population Division (1999) using data on current population size and expected births and deaths. The estimated number of births worldwide each year is 129 million.

**Low birth weight rate (%)**
**Definition** The low birth weight rate is the number of babies weighing less than 2,500 grams at birth per 100 live births.
**Justification for inclusion** Birth weight is a strong predictor of the baby's outcome and also a good measure of the health status of the mother. The LBW rate allows calculation of the number of LBW babies per country and gives an estimated global total of 20 million LBW babies.
**Sources** Data were obtained from a number of sources, mainly from WHO/UNICEF (1995-99), WHO review,[83] and specific sources for a few countries.
**Data quality and limitations of the indicator** It is estimated that approximately 50 percent of babies are weighed at birth. In some countries birth weight is recorded for the majority and the nationally reported LBW rate is representative. In other countries the reported LBW rate is based on survey data or on hospital data. Hospital data may overestimate the LBW rate if more complicate deliveries, such as preterm birth, are occurring in hospital. Conversely hospital data may underestimate the LBW rate if hospital deliveries are mainly women of higher socio-economic standing. Even if babies are weighed, weights may be mis-read or mis-recorded.

**Maternal mortality ratio**
**Definition** Maternal mortality ratio is defined as the number of women who die from conditions related to pregnancy, delivery, or related com-



plications, per 100,000 live births.
**Justification for inclusion** Maternal outcomes are strongly linked to newborn outcomes, and a newborn whose mother dies has a markedly increased chance of dying.
**Sources** All data was from the WHO/UNICEF estimates based on 1995 data. Hill K, AbouZahr C, Wardlaw T. Estimates of maternal mortality for 1995. Bull WHO, 2001 79(3) 182-193. Available on the web at: www.childinfo.org/eddb/mat_mortal/whobulletin79.pdf
**Data quality and limitations of the indicator** In the countries where MMR is highest, the precise estimates are the most difficult. Even in industrialized countries maternal deaths may be unrecorded. The methods and limitations of the MMR estimates are discussed in detail in the source document.

## TABLE II NEWBORN HEALTH SERVICES AND PRACTICES

**Antenatal contact with a skilled provider (%)**
**Definition** The number of pregnant women seen at least once by skilled health personnel because of pregnancy, per 100 live births. A skilled provider includes a doctor, midwife, or nurse with midwifery training.
**Justification for inclusion** Skilled care during pregnancy benefits both mothers and newborns.
**Sources** UN Statistics Division (The World's Women 2000), DHS and CDC surveys and UNICEF. The latter is available on the web at www.childinfo.org/eddb/antenatal/database.htm
**Data quality and limitations of the indicator** The main limitation in the quality of this data is the variability in measurement of "skilled" health care provider, as discussed in more detail under the skilled attendance at delivery. This indicator includes only one antenatal visit, and the recommended number is four. If the indicator were changed to four visits this may be a better predictor of newborn and maternal survival, but data are not available on a wide scale to measure this at present. The content of antenatal care is also important, but is not reflected in this indicator. Even if the attendant is skilled, if there are no standards for care and no supporting system, for example to test and treat syphilis, the care may have little effect on outcome.

**Tetanus toxoid coverage in pregnant women (%)**
**Definition** The number of pregnant women with appropriate tetanus toxoid immunization, per 100 live births. Appropriate tetanus toxoid immunization is considered to be two vaccinations (TT2) that are at least four weeks apart with the second dose a month or more before delivery, or a lifetime total of five or more tetanus immunizations.
**Justification for inclusion** Neonatal tetanus is a leading cause of neonatal deaths. Prevention is highly cost-effective, yet in many countries with high death rates from neonatal tetanus, coverage of pregnant women with TT2 remains low, especially in rural areas where the risk is often higher.
**Sources** Data is based on UNICEF/WHO data (1997-99) as listed in the State of the World's Children 2001.
**Data quality and limitations of the indicator** The data is collected through surveys and national reporting. Women may be unsure of their immunization status or unable to produce records to verify this. The data is adjusted by UNICEF/WHO to allow for reporting issues.

**Skilled attendant at delivery coverage (%)**
**Definition** The number of women with skilled attendance at delivery, per 100 live births. A skilled attendant includes a doctor, midwife, or nurse with midwifery training.
**Justification for inclusion** Skilled attendance at delivery is one of the keys to improving the survival of babies and mothers.
**Sources** Based on UNICEF/WHO 1995 – 2000 and DHS data as listed

in the State of the World's Children 2001 available on the web at www.unicef.org/sowc01/ and additional data from The State of World Population at www.unfpa.org/swp/2000/english/indicators/indicators2.html

**Data quality and limitations of the indicator** The major issues for the quality of this indicator are defining the "skill" of the attendant and reflecting whether the attendant is part of a functioning system. The skill of the attendant is more than a qualification, as a high level of qualification may not correlate with competency. In addition, even a highly skilled attendant will have limited effect in saving the lives of mothers and babies if there is not a functioning system for comprehensive care of complications for the mother or baby, including caesarean section, blood transfusion etc.

**Breastfeeding inthe first hour of life (%)**

**Definition** The percentage of women with an infant less than one year old who recall breastfeeding within the first hour after delivery.

**Justification for inclusion** Breastfeeding is important for the survival of newborns, but also provides benefits that last a lifetime. If all babies were exclusively breastfed for six months, it is estimated that 1.5 million infant lives would be saved each year. Early breastfeeding ensures that the baby benefits by receiving colostrum, which is rich in Vitamin A and K and in antibodies. The mother also benefits in many ways, including a reduced risk of postpartum hemorrhage.

**Sources** Mainly based on DHS, but also including individual country contacts. Data was especially lacking from Europe.

**Data quality and limitations of the indicator** Information regarding breastfeeding is lacking, particularly from industrialized countries. The data available are mainly based on surveys relying on the mother's recall of the time she fed her baby in the last delivery, which may be affected by recall bias.

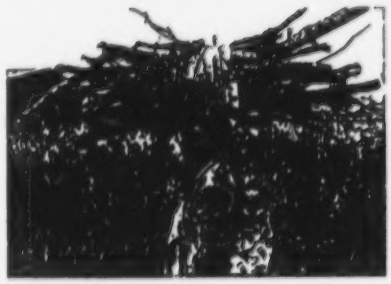
**Exclusive breastfeeding at 0-4 months of age (% based on 24 hour recall by the mother)**

**Definition** The percentage of women with infants aged 0-4 months who report feeding their infant breastmilk alone during the last 24 hours. Exclusive breastfeeding is the practice of feeding breastmilk alone to a baby, with no water, formula milk, or cereals. A baby who is given medicines but otherwise only breastmilk is still considered to be exclusively breastfed.

**Justification for inclusion** A baby who is ever breastfed has advantages over the baby who receives no breastmilk. However, the advantages, especially in protection against infections, are much greater if the baby is exclusively breastfed. WHO recommends exclusive breastfeeding to six months of age.

**Sources** Based on UNICEF, DHS, MICS and WHO data as well as individual country contacts.

**Data quality and limitations of the indicator** Indicators assessing exclusive breastfeeding are compromised by the difficulty of measuring "exclusive" breastfeeding. The most common method of assessment is to ask the mother about the infant's intake during the last 24 hours. A study in Sweden compared 24-hour recall of exclusive feeding to a record of babies' intake since birth. The 24 hour recall was found to be about 40 percent higher at 2 and 4 months of age than the "always exclusively breastfed" category from the record of intake.[46] Many industrialized countries do not collect comparable data regarding exclusive breastfeeding.



# SAVING NEWBORN LIVES

## CALL TO ACTION

With the support and collaboration of national decision-makers, community leaders, health care professionals, the private sector, and international donors, the world's newborns can receive the care and resources they need to survive and thrive. Specifically, we call on policymakers to:

- **Establish newborn care as a priority in national health plans and health reform programs.** Four million newborns die within the first month of life; and four million more are stillborn. While death rates of children under the age of five have fallen dramatically in the past two decades, there has been relatively little change in newborn mortality, even though proven, cost-effective solutions exist to save most of these young lives. For further gains in child survival, reducing the newborn mortality rate must become a national and international priority.
- **Strengthen and expand proven cost-effective services.** Promoting services such as tetanus immuniza-


### ACKNOWLEDGMENTS

**Writer/Editor**
Anthony Costello, Women & Children First, United Kingdom
Victoria Francis
Ali Byrne
Claire Puddephatt

**Contributing Editors, Save the Children**
Anne Tinker, Director, Saving Newborn Lives
Patricia Daly
Gary Darmstadt
Joy Lawn, Consultant
David Marsh
Judith Moore
David Oot
Ron Parlato
Ccoya Sejas, Bolivia
Dianne Sherman

**Editorial Staff**
Robin Bell, Save the Children
Charlotte Storti
Rebecca Lowery

**Reviewers**
Carla AbouZahr, WHO, Switzerland
Abhay Bang, SEARCH, India
Petra ten Hoope-Bender, International Confederation of Midwives, The Netherlands
Zulfiqar Bhutta, Aga Khan University, Pakistan
Rose Kambarami, University of Zimbabwe, Zimbabwe
Jerker Liljestrand, World Bank, United States
José Martines, WHO, Switzerland
Dharma Manandhar, MIRA, Nepal
Claudia McConnell, Women & Children First, United Kingdom
Natasha Mesko, International Perinatal Care Unit, Institute of Child Health, United Kingdom
David Osrin, International Perinatal Care Unit, Institute of Child Health, United Kingdom

tion and immediate, exclusive breastfeeding, ensuring the presence of skilled care at birth, and appropriate and early postnatal care for the newborn can help save countless newborn lives. These successful maternal and newborn care practices should be integrated into existing safe motherhood, child survival, and other community health care services.

- **Conduct appropriate research.** Additional research is required to: identify and test promising new, low-cost approaches and technologies; enhance the understanding of those socio-cultural and economic factors that limit the adoption of improved newborn care practices in local communities; and derive practical lessons from the most successful programs of infant and maternal health and apply them to newborn care.
- **Foster and promote strategic partnerships.** Adequate financial, human, and material resources will be needed to improve newborn health, through the reallocation of existing resources, increased efficiency, or additional funding. Collaboration among a wide range of institutions in developed and developing countries—government ministries, international agencies, professional organizations, universities, and private sector organizations—can provide a foundation on which to build newborn care programs. Such collaboration can also provide important opportunities for sharing experiences and knowledge as well as coordinating program efforts.
- **Support programs that promote women's health.** Newborn survival begins with ensuring the health and nutritional status of the mother and preparation for a safe delivery. Programs need to address barriers that inhibit women's access to information and services, emphasizing community and home-based approaches and the involvement of husbands and other family decision-makers. Expanding access to family planning and improving education and economic opportunities will also contribute substantially to women's health.

**SAVING NEWBORN LIVES INITIATIVE**
Save the Children has launched a new effort called Saving Newborn Lives. Supported by the Bill & Melinda Gates Foundation, Saving Newborn Lives is a 10 to 15 year global initiative to improve the health and survival of newborns in the developing world. The initiative works with governments, local communities, and partner agencies at a national level to make progress toward real and lasting change in newborn health.

**SAVE THE CHILDREN** is a leading international nonprofit child-assistance organization working in nearly 50 countries worldwide, including the United States. Our mission is to make lasting, positive change in the lives of children in need. Save the Children is a member of the international Save the Children Alliance, a worldwide network of 30 independent Save the Children organizations working in more than 100 countries to ensure the well-being and protect the rights of children everywhere.


**Vinod Paul**, All India Institute of Medical Sciences, India
**Imogen Sharp**, Women & Children First, United Kingdom
**Tomris Türmen**, WHO, Switzerland
**David Woods**, University of Capetown, South Africa
**Jelka Zupan**, WHO, Switzerland

**Institutions Providing Data**
**Baby-Friendly Hospital Initiative**, Switzerland
**Centers for Disease Control and Prevention**, United States
**Macro International**, United States
**Medical Research Council**, University of Capetown, South Africa
**Pan Arab Program for Child Survival**, League of Arab States, Egypt
**United Nations Development Fund**, United States
**United Nations International Children's Fund**, United States
**World Health Organization**, European Office, Denmark
**World Health Organization**, Family and Community Health, Switzerland

**Journalist**
Marina Cantacuzino

**Design & Production**
KINETIK Communication Graphics Inc., Washington, DC

**Photography Credits**
**Patricia Daly, Indonesia** page 38
**Rebecca James, Haiti** page 17
**Thomas L. Kelly, India** pages 1, 6, 9, 13, 22, 25, 27, 32
**Thomas L. Kelly, Nepal** back cover, pages 4, 10, 11, 35, 36, 37, 41, 44, 46
**Brian Moody, Malawi** front cover, pages 3, 9, 12, 15, 18, 19, 21, 24, 29, 31, 47, 48
**Anne Tinker, Bolivia** pages 2, 39

Photos in this publication may not represent Save the Children programs.

This report was printed by S+S Graphics utilizing soy-based inks on Sappi Strobe Gloss, a recycled paper containing 10 percent post-consumer waste.

ISBN 1-888393-05-X



© Save the Children, 2001

Saving Newborn Lives
Save the Children
2000 M Street, NW
Suite 500
Washington, DC 20036

www.savethechildren.org

Save the Children.

WOMEN & CHILDREN FIRST
WCF